

IntelliVue Information Center

INSTRUCTIONS FOR USE

Release F

English



PHILIPS

Notice

Instructions for use

Equipment specifications are subject to alteration without notice. All changes will be in compliance with regulations governing manufacture of medical equipment.

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Printing History

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First Edition..... November, 2004

Warning

The warnings described below refer to the following devices:

- IntelliVue M3145/50/55 Information Center
- IntelliVue M3151 Information Center Client
- IntelliVue M3170 Patient Link
- Philips Recorder

Warning

Some pace pulses can be difficult to reject. When this happens, the pulses are counted as a QRS complex, and could result in an incorrect HR and misdetection of cardiac arrest or some arrhythmias. Keep pacemaker patients under close observation. See Chapter 5, “ST/AR Arrhythmia Monitoring,” for specific warnings about monitoring paced patients.

Warning

This device provides ST level change information; the clinical significance of the ST level change information should be determined by a physician.

Warning

Always confirm Information Center observations with clinical observation of patient at the bedside before administering interventions.

About this Book

Overview

This User's Guide can be used with the family of IntelliVue Information Centers and the Philips Recorder. The IntelliVue Information Centers include the:

- IntelliVue M3145/50/55 Information Center
- IntelliVue M3151 Information Center Client
- IntelliVue M3170 Patient Link

The terms “Information Center” and “central” are used throughout this book to refer to the models listed above. Specific differences between the various models are noted in the text where applicable.

This User's Guide contains information specific to the Information Center including information on performing day-to-day tasks and troubleshooting common problems, as well as detailed information about all clinical applications. It also provides a complete list of alarm and INOP messages and configuration choices. For specific information on using the Philips Telemetry System or the Philips IntelliVue Telemetry System, please refer to the your appropriate telemetry system *Instructions for Use* manual.

The on-line Information Center Help provides instructions for completing basic tasks and troubleshooting problems. The on-line help also provides user information for the Philips Telemetry System.

Note—Not all functionality described in this manual may be available to you.

For information about your computer, printer, or other hardware, please consult the accompanying documentation. To verify that the device is installed and working correctly see the “*Performance Assurance*” section of the Philips Information Center Service Manual.

Document Conventions

Procedures

Procedures are indicated in text by the heading “Task Summary” followed by the following table:

Step	Action
1	
2	
3	

Bold Typeface

Objects of actions in procedures appear in **bold** typeface. Note the following example:

Select the **Update** button.

Warnings

Warning

Warnings are information you should know to avoid injuring patients and personnel.

Cautions

Caution

Cautions are information you should know to avoid damaging your equipment and software.

Notes

Note—Notes contain additional information on the Information Center usage.

Contents

What's New in Release F Preface-1

1. Introduction to the Information Center 1-1

The IntelliVue Information Center	1-2
Overview	1-2
Philips Patient Care System	1-2
IntelliVue Clinical Network with Database Server	1-5
Large Network Central Database System	1-7
Intended Use	1-9
The Information Center Features	1-10
Overview	1-10
Recordings and Reports	1-11
Point-of-Care Equipment	1-11
Information Center Display Screens	1-15
Overview	1-15
Main Screen	1-16
System Message Area	1-16
Patient Sectors	1-16
Patient Sector Buttons	1-18
Patient Window	1-20
Single Display	1-20
Dual Displays	1-20
Information/Icons on the Patient Window	1-22
Adjustments on the Patient Window	1-22
Patient Window Buttons	1-23
Application Buttons	1-24
Basic Task Buttons	1-26
Using Standby	1-27
Overview	1-27
With Telemetry, M3 and IntelliVue Patient Monitors	1-27
Task Summary	1-27
With Other Bedside Monitors	1-29
Task Summary	1-29
Making Remote NBP Measurements	1-30
Overview	1-30
Task Summary	1-30

EASI 12-lead Review and Report	1-31
Overview	1-31
Task Summary	1-31
Viewing Other Patients over the IntelliVue Clinical Network	1-33
Overview	1-33
Viewing a Bed Temporarily	1-33
Task Summary	1-33
Overview Beds	1-34
Types of Access	1-34
Full Control if Multiple Viewers	1-35
Optimizing Wireless System Performance	1-35
Overview	1-35
Minimizing Data Loss	1-35
Low Signal Strength	1-36
Interference	1-36
Wireless System Messages	1-37
Configuration	1-38
Using the On-line Help	1-39

2. Patient Management. 2-1

Introduction	2-2
Admitting a Patient	2-3
Overview	2-3
With M3 or IntelliVue Patient Monitors	2-3
With Other Bedsides	2-3
Task Summary	2-4
Changing Patient Information	2-9
Overview	2-9
With M3 or IntelliVue Patient Monitors	2-9
Task Summary	2-9
Resolving Conflicts with M3 or IntelliVue Patient Monitors	2-10
Overview	2-10
Task Summary	2-11
Care Groups	2-13
Overview	2-13
M3 or IntelliVue Patient Monitors	2-13
Setting up a Care Group	2-14
Assigning a Beds to Care Groups	2-17
Discharging a Patient	2-19
Overview	2-19

With M3 and IntelliVue Patient Monitors	2-19
With Other Bedsides	2-20
Task Summary	2-20
Discharging for Transport	2-22
Overview	2-22
Task Summary	2-22
Transferring Patient Data to a New Bed	2-24
Overview	2-24
Task Summary	2-24
Fixed and Flexible Monitoring	2-28
Overview	2-28
Fixed Monitoring	2-28
Flexible Monitoring	2-28
Assigning a Bed and/or Equipment to a Sector	2-29
Overview	2-29
Task Summary	2-30
Pairing/Unpairing Telemetry Equipment	2-31
Overview	2-31
Parameter/Wave Behavior	2-31
Alarm behavior	2-32
Control behavior	2-33
Task Summary	2-34
Changing Equipment for a Sector	2-35
Overview	2-35
Patient Settings	2-35
Task Summary	2-37
Assigning an Overview Bed to a Sector	2-38
Overview	2-38
Fixed monitoring	2-38
Flexible Monitoring	2-38
Overview Bed Controls	2-38
Task Summary	2-39
Clearing (Unassigning) a Sector	2-40
Fixed Monitoring	2-40
Flexible Monitoring	2-40
Task Summary	2-40
Assigning a Secondary Wave	2-42
Overview	2-42
Task Summary	2-42

3. Recordings and Reports	3-1
Introduction	3-2
Types of Recordings	3-3
Alarm Recordings	3-4
Making a Delayed Recording	3-5
Overview	3-5
Task Summary	3-6
Action of Patient Sector Button	3-7
Making an Alarm/Delayed Recording Continuous	3-7
Extending a Delayed Recording at the M3 Monitor	3-7
Making a Delayed Recording for All Beds	3-8
Saving a Strip from the Patient Sector	3-8
Overview	3-8
Task Summary	3-8
Selecting the Waves that are Saved	3-8
Making Real-Time Recordings	3-9
Overview	3-9
Task Summary	3-9
Controls and Indicators on the Philips M1116B 2-Channel Recorder Module	3-11
Controls and Indicators on the Philips M3176C 2-Channel Recorder	3-12
Controls and Indicators on the M3160A 4-Channel Recorder	3-13
Recording Priority	3-14
Recording Status Messages	3-15
Main Screen Messages	3-15
Recorder Messages at the M3 Monitor	3-16
Annotation	3-17
Re-Annotation	3-18
Loading Paper into the M1116B 2-Channel Recorder	3-19
Task Summary	3-19
Testing	3-20
Task Summary	3-21
Loading Paper into the M3176C 2-Channel Recorder	3-22
Overview	3-22
Task Summary	3-22
Testing	3-23
Loading Paper into the 4-Channel Recorder	3-24
Philips M1116B 2-Channel Recorder Connections	3-26
Philips M3176C 2-Channel Recorder Connections	3-27
M3160A 4-Channel Recorder Connections	3-28
Ordering Information for Supplies for Recorders	3-29

Paper	3-29
Cleaning Kit	3-29
Printing Reports	3-29
Printer Status Message	3-30
Printer Messages at the M3 Monitor	3-30
Cleaning the Philips M1116B 2-Channel Recorder Printhead	3-31

4. Alarm Management and Setup 4-1

Overview	4-2
M3 Monitors	4-2
IntelliVue Patient Monitors	4-3
Alarm Indicators	4-3
Alarm Levels and Priorities	4-4
Active Alarm Sound	4-6
Alarm Messages	4-7
Arrhythmia Alarm Messages	4-8
Arrhythmia INOP/Technical Alarm Messages	4-11
Alarm Adjustments	4-13
Overview	4-13
Adjusting Alarms	4-13
Turning Alarms On/Off	4-16
Task Summary	4-16
Arrhythmia Analysis Off	4-23
Alarm Adjustment Effects	4-24
Timeout Periods	4-25
Overview	4-25
Clearing the Timeout Period	4-26
Alarm Chaining	4-26
Overview	4-26
Alarm Groupings	4-26
Alarm Announcing	4-27
Alarm Behavior and Timeout periods	4-27
Alarm Priority Chains	4-28
Silencing Alarms	4-30
Overview	4-30
Alarm Behavior	4-30
Alarm Reminders	4-32
Task Summary	4-33
Fast Alarm Review Disabled	4-33
Fast Alarm Review Enabled	4-33

Suspending/Pausing Alarms	4-34
Telemetry	4-34
Bedside Monitors	4-34
TeleMon	4-34
Telemetry Smart Limits	4-35
Overview	4-35
Automatically Set Smart Limits	4-35
Manually Set	4-36
Smart Limits Examples	4-36
Adjusting the Alarm Tone Volume	4-38
Recording/Storing Alarms	4-39
Overview	4-39
Task Summary	4-40
Storage of Arrhythmia Alarms at the Information Center	4-40

5. ST/AR Arrhythmia Monitoring 5-1

Introduction	5-2
Overview	5-2
Levels of Arrhythmia Analysis	5-3
Basic Arrhythmia	5-3
Enhanced Arrhythmia	5-4
How the ST/AR Algorithm Works	5-5
Overview	5-5
Ensuring Accurate Arrhythmia Monitoring	5-6
Example of Optimized Non-Paced ECG	5-11
Example of Optimized Paced ECG	5-12
Aberrantly conducted beats	5-12
Atrial Fibrillation and Flutter	5-13
Intermittent Bundle Branch Block	5-13
Paced Patients	5-14
Overview	5-14
Warnings for Paced Patients	5-14
Repolarization Tails	5-16
Learning	5-17
Overview	5-17
Learning	5-17
Single Lead Analysis	5-17
Multilead Analysis	5-17
Multilead Analysis With Changes in One Lead	5-18
EASI ECG Monitoring	5-18

Monitoring During Leads Off	5-19
Fallback	5-19
Multilead Analysis	5-19
Singlelead Analysis	5-19
EASI ECG Monitoring	5-19
Extended Monitoring (Telemetry)	5-19
Status Messages	5-20
Overview	5-20
Rhythm Status Messages	5-20
Ectopic Status Messages	5-22
False Alarms	5-24

6. Patient Data Review 6-1

The Information Center Review Windows	6-2
Overview	6-2
Review Window Features	6-4
Using Strips in Review Windows	6-5
Alarm Review	6-8
Overview	6-8
Using Alarm Review	6-9
Fast Alarm Review	6-15
Trend Review	6-17
Overview	6-17
Trend Review with Graphic Display	6-17
Trend Review with Tabular Display	6-20
Event Review	6-22
Overview	6-22
Cursor/Event Information	6-22
Event Bars	6-23
Using Event Review	6-24
Reports	6-27
Strip Reports	6-27
Event Summary Report	6-28
Wave Review	6-30
Overview	6-30
Navigation Choices	6-30
No Data/Invalid Data	6-32
Using Wave Review	6-33
Reports	6-36
Strip Reports	6-36

Duration Reports	6-37
ST Review	6-38
Overview	6-38
Navigation Choices	6-39
Using the ST Cursor Buttons	6-41
Using ST Review	6-41
12-Lead Review	6-43
Overview	6-43
12-Lead Review with 12 Lead Captures	6-43
Using this Window	6-44
EASI Derived 12-Lead Review	6-45
Navigation Choices	6-45
Using This Window	6-47
12-Lead Export Window	6-48
Export Data to Holter System	6-50
Overview	6-50
Task Summary	6-51
Changing the Waves that are Stored	6-53
Overview	6-53
Task Summary	6-53
Scheduled Reports	6-54
Overview	6-54
All Reports	6-54
Trend Report	6-56
Alarm Report	6-58
Event Report	6-59
Wave Report	6-60
Summary/Unit Report	6-62
Information Center Web Access	6-64
Overview	6-64
Intended Use	6-65
Accessing the Information Center Web	6-65
Notes on Use	6-67
Multilead ECG	6-67
Alarm Review	6-67
Trend Review	6-68
Displaying Data in Tabular Format	6-68
Event Review	6-68
Wave Review	6-69
ST Review	6-69

12-Lead Review	6-69
7. Alarm Paging.....	7-1
Introduction	7-2
Data Sent.....	7-3
Alarms	7-3
Reminder Alarms.....	7-3
Loss of Connection to Database Server	7-4
Assigning Beds/Alarms to a Paging Device	7-5
Overview.....	7-5
Task Summary	7-5
Sending Manual Pages.....	7-7
Overview.....	7-7
Task Summary.....	7-7
Sending Text Messages	7-8
Overview.....	7-8
Task Summary.....	7-8
Specifying Alarms for Automatic Paging	7-9
Overview.....	7-9
Task Summary	7-9
Viewing Paging Device/Bed Assignments	7-10
Overview.....	7-10
View by Device Task Summary.....	7-10
View by Bed Label Task Summary	7-12
8. ST for Bedside Monitors	8-1
Overview	8-2
The Measurement	8-3
Information Center's ST/AR ST Algorithm.....	8-4
Displayed ST Data	8-4
EASI ST Analysis.....	8-4
Enabling ST Review for Bedside Monitors	8-5
Overview.....	8-5
Adjusting Measurement Points.....	8-5
CANNOT ANALYZE ST INOP	8-7
ST Data Summary	8-8
9. Information Center Configuration	9-1
Information Center Unit Settings Menus.....	9-2
Overview.....	9-2

Accessing the Unit Settings Menus	9-4
Using the Unit Settings Menus	9-5
Printing the Unit Settings.	9-5
Arrhythmia Alarms Unit Settings	9-6
Record/Store/Page Alarms Unit Settings	9-9
ST Unit Settings (telemetry)	9-13
Trend Groups Unit Settings.	9-15
Event Groups Unit Settings.	9-22
Stored Waves Unit Settings.	9-26
Scheduled Reports Unit Settings.	9-28
Overview	9-28
Printing Behaviors	9-28
All Reports	9-29
Trend Report Unit Settings	9-30
Alarm Report Unit Settings	9-32
Event Report Unit Settings	9-33
Wave Report Unit Settings	9-34
Summary Report Unit Settings	9-35
General Setup Unit Settings	9-36
Volume Control Unit Settings.	9-37

10. Information Center

Safety and Specifications 10-1

Regulatory and Safety Specifications	10-2
Declaration	10-2
Authorized EU Representative.	10-2
Electromagnetic Compatibility	10-3
Reducing Electro-magnetic Interference	10-4
Restrictions for Use	10-4
Information Center Software Specifications	10-5
Display	10-5
M3150/55 Information Center	10-6
Features	10-6
Options.	10-6
M3151 Information Center Client.	10-7
Features	10-7
Options.	10-7
M3170 Patient Link.	10-8
Features	10-8
Options.	10-8

M3154 Database Server	10-9
Features	10-9
Options	10-9
M3169 Small Database Server	10-10
Features	10-10
Options	10-10
Release F.0 Hardware Performance Requirements	10-11
ECG Performance Disclosure/Specifications	10-16
Specifications for the Philips M1116B 2-Channel Recorder	10-19
Declaration	10-19
Specifications for the M3176C 2-Channel Recorder	10-20
Declaration	10-20
Specifications for the M3160A 4-Channel Recorder	10-21
Installation Information	10-22
Environment	10-22
Archetypical Input Power Source Requirements	10-23
Grounding Information Center and Recorder	10-23
Condensation	10-23
Explanation of Symbols	10-24
During Power Transitions/Loss	10-26
If Connection to the M3154/M3169 Database Server is Lost	10-27
Local Database Mode	10-27
Remote Diagnostics	10-29
Maintenance	10-29
Cleaning	10-30
Overview	10-30
Surface Cleaning	10-31
Touch Screen Display Cleaning	10-32

A. Trend Definitions A-1

B. Event Definitions B-1

Defined Events	B-1
Alarm Defined Events	B-4

C. ST/AR Configuration Reporting C-1

First Character Codes	C-2
Second Character Codes	C-2
Third and Fourth Character Codes	C-4
Fifth Character Codes	C-8

Sixth Character CodesC-9

Seventh Character Code.....C-11

D. Sales and Support Offices D-1

What's New in Release F

This section highlights the differences between Release E.01 of the IntelliVue Information Center and Release F of the IntelliVue Information Center. Release F of the Information Center includes the following:

- Support of a new telemetry system, the Philips IntelliVue Telemetry System, and new TRx and TRx⁺ transceivers. See the *Philips IntelliVue TRx and TRx⁺ Telemetry System Instructions for Use* for more information.
- Optionally, the integration of a paging system, Alert Data Integration™, for secondary notification of patient alarms. The paging system acquires patient alarm data from the bedside or the telemetry monitoring system and relays it in textual format to a paging device such as a pager, marquee display or cell-phone. No waveform data is sent. See “Chapter 7. Alarm Paging” for information on using Alert Data Integration.
- The ability to pair a telemetry device with an IntelliVue Patient Monitor for display of telemetry data (waveforms, parameters, and alarms) as well as bedside parameters on the IntelliVue Patient Monitor. When paired, the telemetry data automatically displays as a permanent overview session in the Telemetry Overview window on the IntelliVue Patient Monitor. At the Information Center, the telemetry data and any bedside data (for example, NBP) are integrated in the patient sector. See “Pairing/Unpairing Telemetry Equipment” on page 2-31 for information on pairing functionality and your *IntelliVue Patient Monitor Instructions for Use* for information on using the Telemetry Overview window at the IntelliVue Patient Monitor.
- For IntelliVue Patient Monitors, the ability to start or stop an NBP bedside measurement from the Information Center. See “Making Remote NBP Measurements” on page 1-30 for more information.

- For M3, IntelliVue Patient Monitors, and bedsides with telemetry devices the ability to select the wave that will display as the secondary wave in the patient sector for a patient. See “Assigning a Secondary Wave” on page 2-42 for more information.
- A new 2-channel recorder, the M3176C 2-channel recorder. See “Chapter 3. Recordings and Reports” for information on using the M3176C 2-channel recorder and initiating recordings.
- For systems connected to a hospital information system, the ability to admit a patient using patient demographic information obtained from the hospital information system. See “Admitting a Patient” on page 2-3 for information on admitting a patient to the Information Center from a hospital information system.
- The ability for a clinician to silence alarms in the bed-to-bed overview window on the IntelliVue Patient Monitor. When this feature is enabled selecting the Silence button at the IntelliVue Patient Monitor silences all active alarms at the Information Center for the bed that is currently being overviewed. See “General Setup Unit Settings” on page 9-36 for information on enabling this feature and your *IntelliVue Patient Monitor Instructions for Use* for information on using the bed-to-bed overview window and silencing alarms.
- Usability enhancements to the Care Groups windows on the Information Center. See “Care Groups” on page 2-13 for information on using the Information Center Care Groups windows.

Introduction to the Information Center

This chapter provides an overview of the IntelliVue Information Center. It includes the following sections:

- The IntelliVue Information Center 1-2
- Intended Use 1-9
- The Information Center Features 1-10
- Information Center Display Screens. 1-15
- Using Standby. 1-27
- Making Remote NBP Measurements 1-30
- EASI 12-lead Review and Report. 1-31
- Viewing Other Patients over the IntelliVue Clinical Network. 1-33
- Optimizing Wireless System Performance. 1-35
- Configuration 1-38
- Using the On-line Help 1-39

The IntelliVue Information Center

Overview

The IntelliVue Information Center is part of the Philips Patient Care System. The IntelliVue Information Center consists of:

- the Information Center Release F Software (M3290A), including the ST/AR ST Segment and Arrhythmia Algorithm Software
- Windows XP/2000 PC
- an uninterruptible power supply (UPS)
- the Philips Recorder
- accessory printer (optional)

The following models are available to meet your specific patient monitoring needs. These include the:

- IntelliVue M3145/50/55 Information Center
- IntelliVue M3151 Information Center Client
- IntelliVue -M3170 Patient Link

Note— The M3145 Information Center is for use with the M3169 Small Database Server. Otherwise it is identical in in features and specifications to the M3155 Information Center.

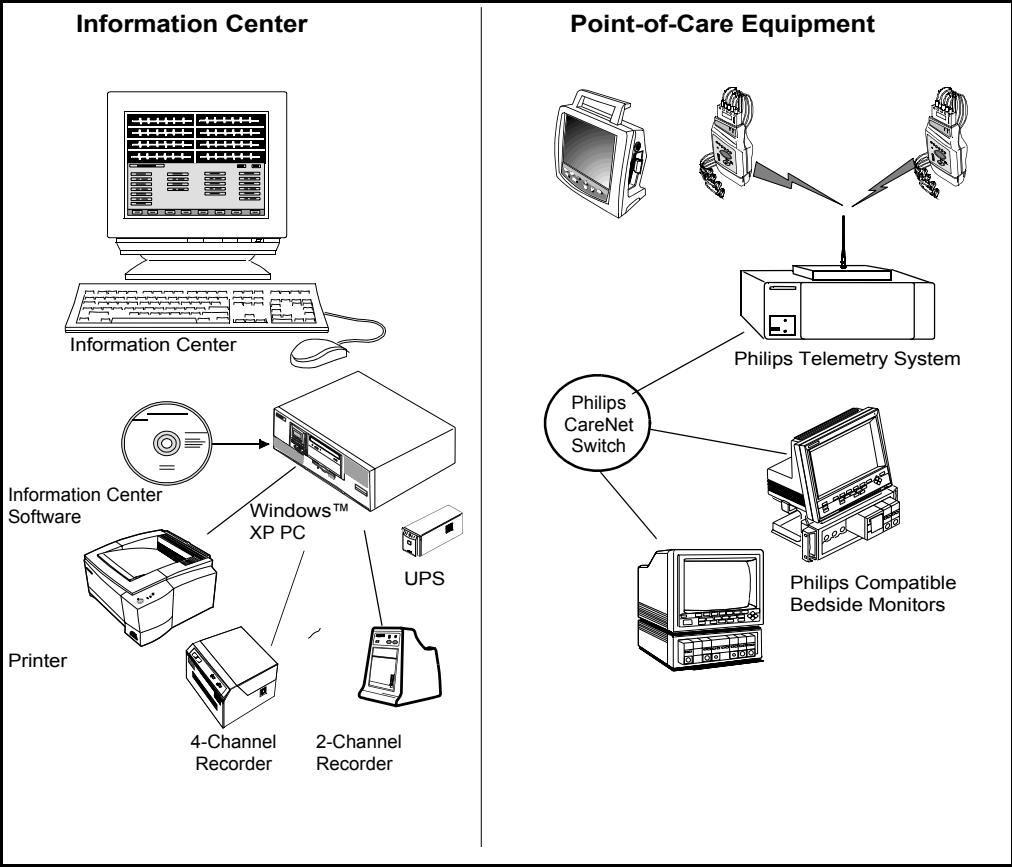
Note— Differences in features or functionality are called out where appropriate.

For a description of the features and available options with each of the models refer to Chapter 10, “Information Center Safety and Specifications.”

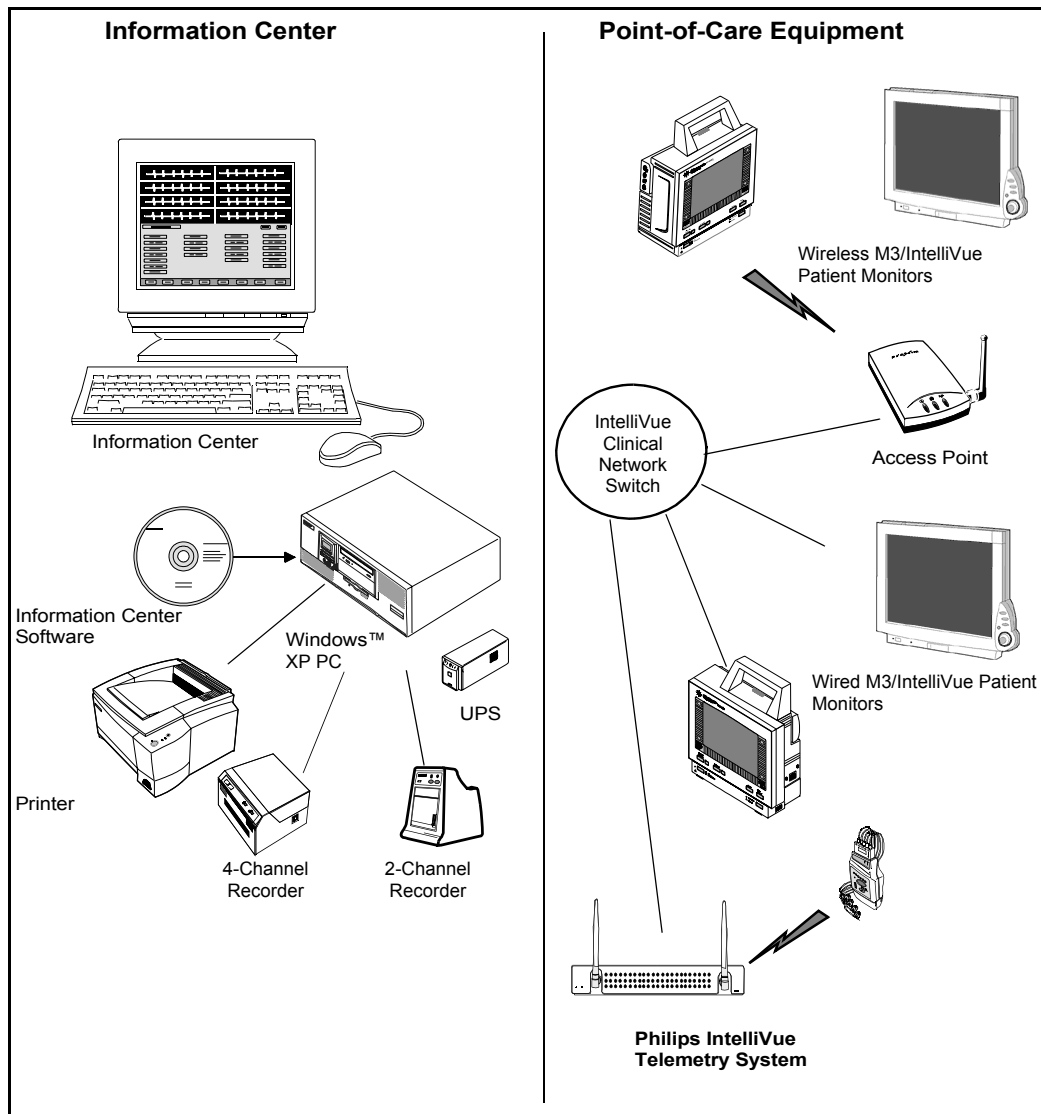
Philips Patient Care System

The Information Center displays information via the Philips CareNet network and/or IntelliVue Clinical Network, received from point-of-care equipment connected to the network.

The illustrations on the following pages show an Philips Patient Care System with an Philips CareNet network and the IntelliVue Clinical Network.



Philips Patient Care System with CareNet



Philips Patient Care System with IntelliVue Clinical Network

IntelliVue Clinical Network with Database Server

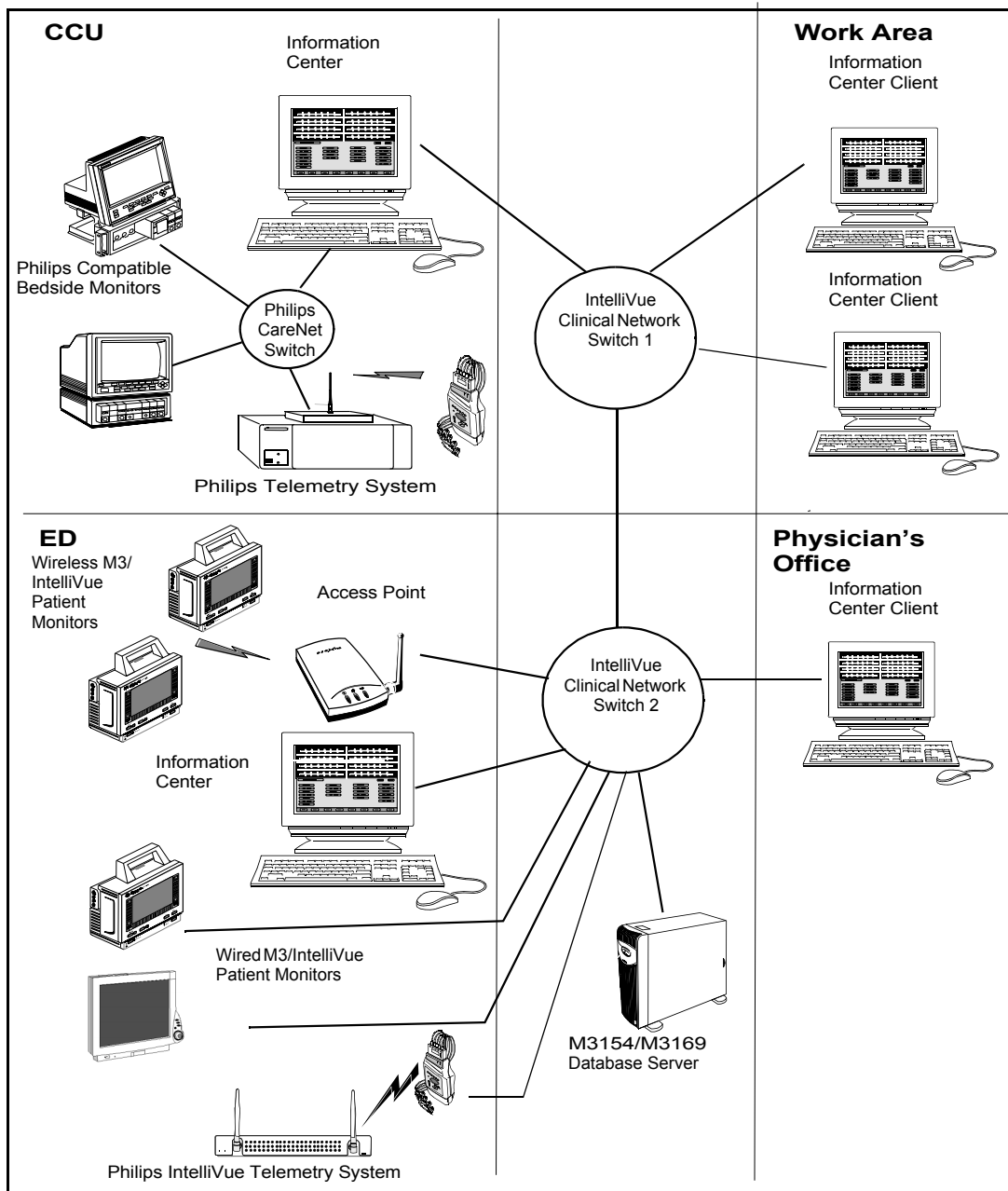
The IntelliVue M3185 Clinical Network with the M3154 Database Server or the M3169 Database Server, enables transmission of data between Information Centers, providing access to both real-time and stored data within and across clinical units.

The IntelliVue Clinical Network with the M3169 Database Server stores data for up to 48 patients and supports up to 3 M3150 Information Centers for monitoring patients and up to 3 M3151 Information Center Clients for reviewing patient data. The M3169 Database Server patient data storage includes full disclosure waveforms and physiologic parameters for up to 48 hours per patient, up to 4 waves per patient, and up to 150 30-second alarm records and saved strips, with up to 4 waves per event.

The IntelliVue Clinical Network with the M3154 Database Server stores data for up to 128 patients and supports up to 8 M3150 Information Centers for monitoring patients and up to 8 M3151 Information Center Clients for reviewing patient data. The M3154 Database Server patient data storage includes full disclosure waveforms and physiologic parameters for up to 96 hours per patient, up to 4 waves per patient, and up to 150 30-second alarm records and saved strips, with up to 4 waves per event.

The IntelliVue Clinical Network is based on industry standard components and cabling.

The following illustration shows an example of a IntelliVue Clinical Network connecting Information Centers in separate clinical units.

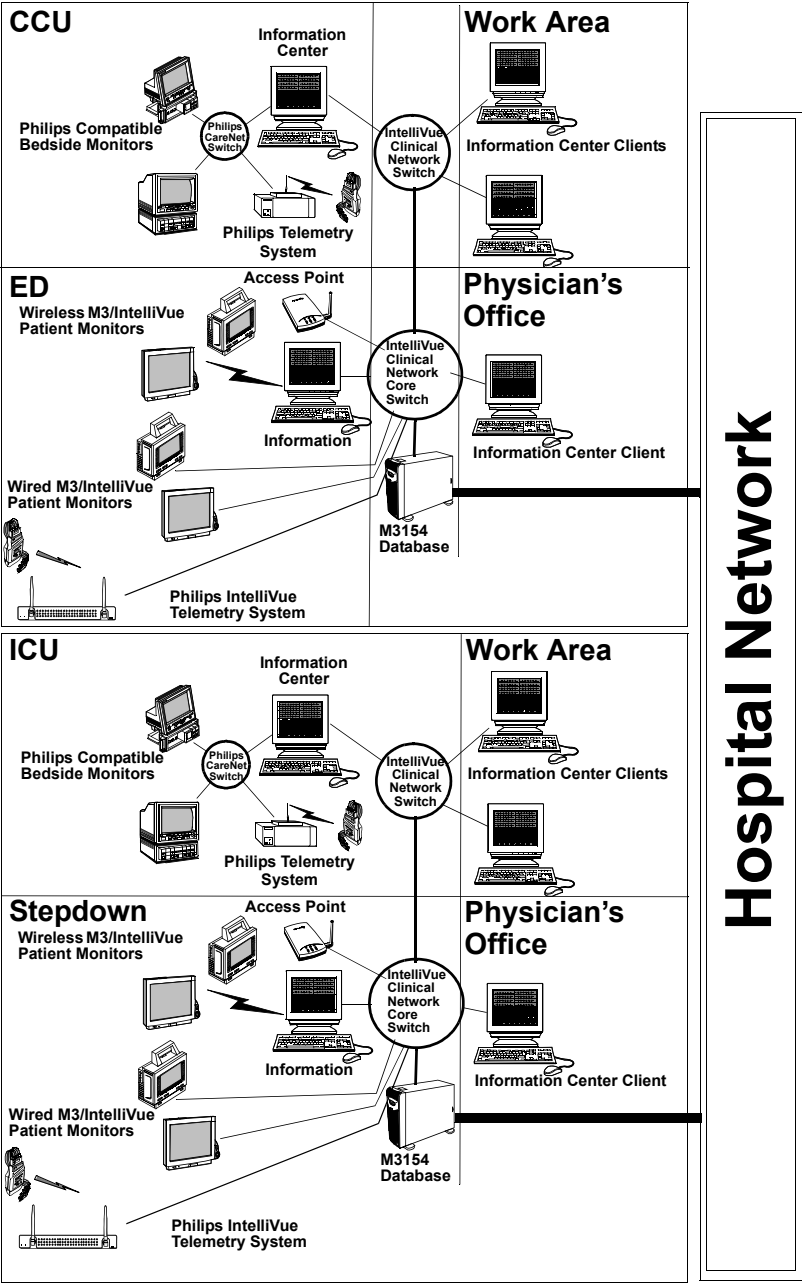


Philips Patient Care System with IntelliVue Clinical Network and Database Server

Large Network Central Database System

The Large Network Central Database System allows up to 15 M3154 Database Servers to be interconnected on the hospital network. This connectivity provides clinicians with the ability to transfer patients across care units that are on separate database servers. In addition, for systems with the M2385 Application Server, the Large Network Central Database System allows you to view, through the Information Center Web Access, near-realtime waves, parameters and alarms, as well as review all retrospective data for up to 1920 patients across care units that are on separate database servers (see “Information Center Web Access” on page 6-64).

The following illustration shows an example of a Large Network Central Database System.



Philips Patient Care System with Large Network Central Database System

Intended Use

The intended use of the Information Center Software is to display physiologic waves, parameters, and trends, format data for strip chart recordings and printed reports, and provide the secondary annunciation of alarms from other networked medical devices at a centralized location. The Information Center Software provides for the retrospective review of alarms, physiologic waves and parameters from its database.

An additional intended use of the Information Center Software is to provide primary annunciation of alarms and configuration and control access for networked telemetry monitors.

This product is not intended for home use.

Rx only.

The Information Center Features

Overview

The Information Center Software allows you to:

- View waves and physiological parameter information sent over the monitoring network. Up to 32 waves can be displayed on a single main screen.
- Be alerted to patient alarms that have been detected by networked monitoring devices and respond to the alarms.
- Perform ST/AR multilead arrhythmia analysis on up to two leads of ECG. ST/AR ST segment monitoring provides ST elevation and depression measurements for telemetry-monitored patients.

Note—ST/AR analysis for M3 and IntelliVue Patient Monitors is done at the monitor. ST analysis for all bedside monitors is done at the monitor.

- Make strip chart recordings on a Philips Recorder and (if a printer is available) printed reports requested from the point-of-care and/or the Information Center.
- Access a retrospective review of up to 96 hours of patient data, including full disclosure waves and parameters, alarms, ST segments, events, trends, EASI derived reconstructed 12 lead ECG.
- View real-time data for a patient being monitored by another Information Center connected via Philips CareNet. If connected via the IntelliVue Clinical Network, you can view both real-time and stored data for a patient monitored on another Information Center, and that Information Center can be in the same clinical unit or in another unit.
- Provide the management of grouping of beds per nursing assignment ('Care Groups'). A single Care Group is typically named for a caregiver who is responsible for multiple patients within a single care unit. A Care Group can be assigned a color that will display as the background for the bed label on the Information Center. Color by Care Group helps the caregiver to quickly identify beds within their Care Group.

- Export ECG waveform data from the Information Center to a Zymed Holter for Windows™ - Model 2010 for analysis.
- Provide notification of alarms in textual format to a receiving device such as a pager, marquee display or cell-phone. This option, Alert Data Integration (available in limited geographies), is for secondary notification of alarms. It is not intended for primary notification of alarms.

Recordings and Reports

Recordings can be requested from the Information Center or from networked products.

If a printer is connected, reports requested from the Information Center or from networked products can be printed.

Point-of-Care Equipment

The Information Center communicates with the following monitoring devices:

- Bedside monitors: IntelliVue Patient Monitors Release A.1 or higher, CMS Revision C+ or higher, V26 and V24 Revision C+ or higher, M3 (wired and wireless) Release D or higher, and Compact Configurable Monitor 78352C/54C.

Note—In this book the term “M3” refers to Revision D.0 or higher of the M2, M3, and M4 bedside monitors. The term “IntelliVue Patient Monitor” refers to the family of Philips IntelliVue MPxx bedside monitors. Differences in features or functionality are called out where appropriate.

- Philips IntelliVue Telemetry System, Philips Telemetry System Release C or higher and Hewlett-Packard M1403 Digital UHF Telemetry System with Option C03. If a Phillips telemetry device is connected to the TeleMon bedside monitor, it is referred to as “docked”.

The Information Center Features

The Information Center provides the following functionality for point-of-care equipment connected via Philips CareNet or the IntelliVue Clinical Network.

Function	M3 Bedside Monitors connected via the IntelliVue Clinical Network	Bedside Monitors connected via Philips CareNet	Telemetry	IntelliVue Patient Monitors connected via the IntelliVue Clinical Network
Central monitoring (patient management alarm annunciation, etc.)	Yes	Yes	Yes	Yes
ST/AR Arrhythmia monitoring at the Information Center	No -- provided by bedside monitor.	Yes	Yes	Yes -- ST/AR Arrhythmia functionality is available at the Information Center but is provided by the bedside monitor.
Arrhythmia control and review at the bedside.	Arrhythmia control is at the bedside; review is available at the bedside and at the Information Center.	Yes - CMS patient monitors must be Rev. C or greater.	N.A.	Yes

Function	M3 Bedside Monitors connected via the IntelliVue Clinical Network	Bedside Monitors connected via Philips CareNet	Telemetry	IntelliVue Patient Monitors connected via the IntelliVue Clinical Network
ST/AR ST segment monitoring at the Information Center	No - if present, ST segment monitoring is provided from the bedside.	Yes - with limited functionality at the Information Center. Primarily provided from the bedside.	Yes	No - if present, ST segment monitoring is provided from the bedside.
ST trends and snippets in ST Review	Yes	Yes	Yes	Yes

The Information Center Features

Function	M3 Bedside Monitors connected via the IntelliVue Clinical Network	Bedside Monitors connected via Philips CareNet	Telemetry	IntelliVue Patient Monitors connected via the IntelliVue Clinical Network
EASI™ ECG capability	Yes, 3 leads, for M3-E bedside monitors connected to the Multi-Measurement Server only. No for all other M3 besides.	Yes - CMS patient monitors must be Rev. B.0 or greater. V26 and V24 monitors must be Rev. C.0 or greater.	Yes	Yes
Information Center printing of recordings and reports requested from the point-of-care	Yes <i>Note</i> —Reports are not available if requested from M3 wireless monitors to be printed at the Information Center printer. However, they can be printed on a local printer.	Yes	Yes - recordings via telemetry button on the telemetry device (if configured) or from TeleMon (if the telemetry device is docked).	Yes

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Information Center Display Screens

Overview

There are two different size CRT displays, a flat panel display as well as a touch screen flat panel display available for viewing patient data and accessing clinical applications. Displays are ordered to match your specific unit requirements. A mouse is provided with each of the displays for accessing patient data. Simply move the mouse cursor to a labeled application button and click, and the button's application is immediately displayed on the screen. A keyboard is also provided with each of the displays for entering and changing patient data and other information.

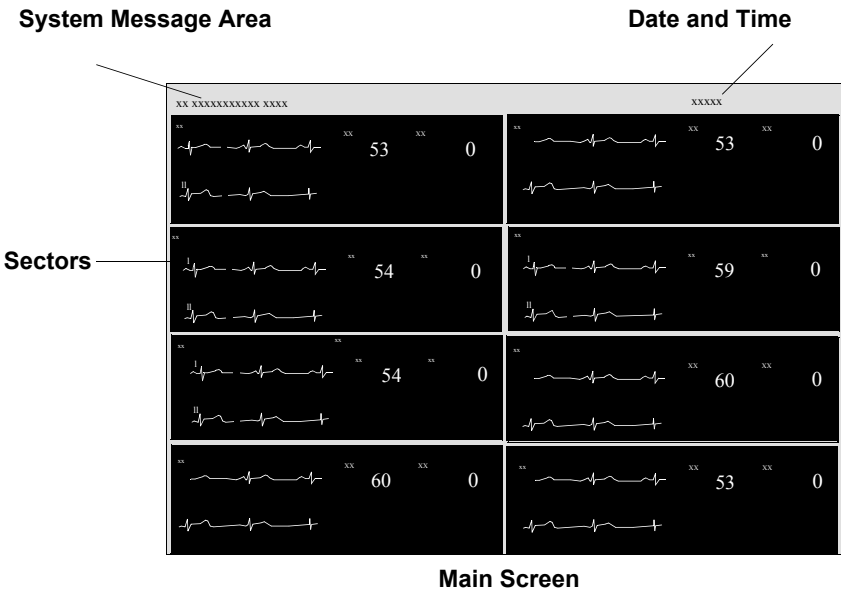
With a touch screen display you can access patient data by either using the mouse or by pressing the screen element directly on the display using the tip of your finger or a stylus. The touch display is most effective for maneuvers such as silencing alarms on the display, accessing patient windows or generating recording strips. More precise selections and measurements, for example caliper measurements, may be more accurately performed using the mouse. Should the touch screen display become unavailable for any reason patient data can be accessed by using the mouse and keyboard. When using touch screen displays, be sure to keep the area free of items that may inadvertently touch the screen.

The Information Center has two types of screens on the display:

- The Main Screen, or resting display, (illustration below) which has patient sectors; no windows are open.
- The Patient Window, which displays data for a patient. You perform most tasks either on the Patient Window or other application windows that you access from the Patient Window.

Main Screen

The Main Screen displays real-time waves, numerics, and alarms from multiple patients. It can be configured to show up to 32 waves in either single- or dual-column configurations.



System Message Area






An area at the top of the screen displays system status messages, date and time and any name that may be associated with this Information Center, for example, "CCU Hallway1".

Patient Sectors

Up to 16 patients can be displayed on the Main Screen. The number of waves and amount of information in a sector depends on the size of the sector. All waves are 3.3 seconds in length in a dual-column format and 7.0 seconds in length in a single-column format (at 25 mm/s speed -- waves at 12.5 mm/s are twice as long).

In addition to the bed label, waves, and numerics, the information that displays in a sector can include:

- Patient name, if configured.
- Heart Rate alarm limits, if configured (not available for M3 monitors).
- First line of screen notes, if configured.

- Paced indicator (if set).
- Alarms off indicators and alarm and technical INOP messages (if applicable).
- The  icon to the right of the bed label for telemetry monitored patients. **Note**—If the telemetry device is connected to the TeleMon, the icon will have a box around it.
- The  icon to the right of the bed label indicates that the telemetry device is paired to a bedside monitor (see page 2-31).
- If the M3 or IntelliVue Patient Monitor is connected to a wireless IntelliVue Clinical Network, there is a wireless equipment icon  to the right of the bed label.
- An “*” to the left of the bed label for overview beds (see page 1-33).
- A  in the upper right-hand corner to indicate that a conflict exists between patient data at the Information Center and patient data at the M3 or IntelliVue Patient Monitor.
- For TRx and TRx⁺ transceivers and battery operated IntelliVue Patient monitors a  battery gauge icon displays in the upper right-hand corner of the patient sector to indicate remaining battery strength. The battery icon displays 5 levels: approximately 100% to 75%, 75% to 50%, 50% to 25%, 25% to Battery Weak, or Battery Weak-Replace Battery strength. **Note**—For TRx and TRx⁺ transceivers the battery gauge calculation is for disposable (alkaline) batteries only. If rechargeable batteries are used the gauge is not accurate. Disable the display of the battery gauge through the Telemetry Setup window.

When the cursor is positioned over the bed label or when the bed label is selected by using a touch screen display, the following information is displayed:

- Telemetry device number, if telemetry monitored.
- Monitor label (number), if M3 or IntelliVue Patient Monitor.

When the Patient Window is open, the bed label in the sector for the open Patient Window has a dashed line around it. For beds assigned to a Care Group (see “Care Groups” on page 2-13) the bed label in the patient sector will display the selected color as the background for the bed label. For beds not assigned to a Care Group, or beds who have the color black assigned, the bed label has white text on black background.

**Patient Sector
Buttons**

All tasks start in the patient sector. Normally, there are no buttons visible in the sector. Buttons in the sector are activated when the cursor is in the sector or, when using a touch screen display, the sector is selected by touching the screen with a stylus or the tip of your finger. The sector is then outlined, and the buttons become visible.

There are two buttons available from the patient sector. One is the **Patient Window** button, which accesses the Patient Window. The other depends on how your system is configured. The following table explains the button labels.

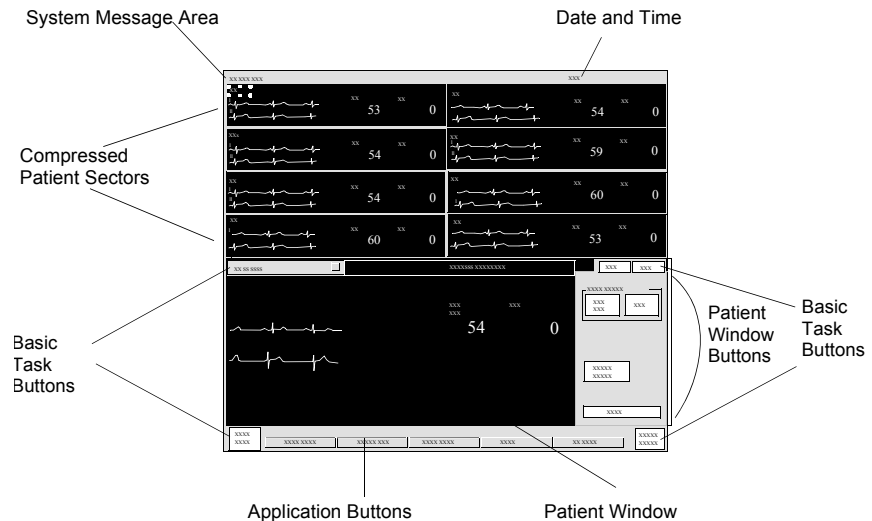
Condition	Button Label	Action when Button Selected
No alarm pending	Record	Starts a delayed non-continuous (timed) recording.
	Save	Generates the saving of a 30-second strip in Alarm Review.
	Record and Save	Starts a delayed non-continuous (timed) recording as well as the saving of a strip.
Alarm pending	Silence	Turns the alarm sound off, and the sector changes to its normal color (can also click or, for touch screen displays, touch anywhere in the sector except the Patient Window button).
	Silence/Review	Turns the alarm sound off and the sector changes to its normal color and opens a Patient Window with the Fast Alarm Review for that alarm. <i>Note</i> —Can click or, for touch screen displays, touch anywhere in the sector (except on a button) to turn the alarm sound off without displaying the alarm.
<i>Note</i> —Your Information Center may be configured to not allow silencing of bedside alarms at the Information Center. In this case a Silence button will only appear for telemetry beds. In the case of M3 and IntelliVue Patient Monitors, alarms can be silenced at the Information Center if both the Information Center and M3 or IntelliVue Patient Monitor are configured with remote silence enabled. If this is not the configuration, the Silence button is present at the Information Center, but is not active.		

Condition	Button Label	Action when Button Selected
Bed in Standby	Resume monitoring	<p>Bedside Monitor (other than M3 or IntelliVue Patient Monitor): button is greyed out, indicating that monitoring must be resumed at the bedside.</p> <p>Telemetry, M3, and IntelliVue Patient Monitors: takes the bed out of Standby, and the button reverts to the normal label.</p> <p><i>Note</i>—If the telemetry device is docked at TeleMon, the bed cannot be put in Standby.</p>

Note—If there is no bed assigned to a sector, the **Sector Setup** button is displayed instead of the Patient Window button. Selecting this button accesses the appropriate page of the Sector Setup Window.

Patient Window

Single Display When a Patient Window or an application window is open, all the patient sectors are still visible in the top half of the screen, but are compressed (see the illustration below). The Patient Window allows you to view up to 4 waves at a time.



Display with Patient Window Open

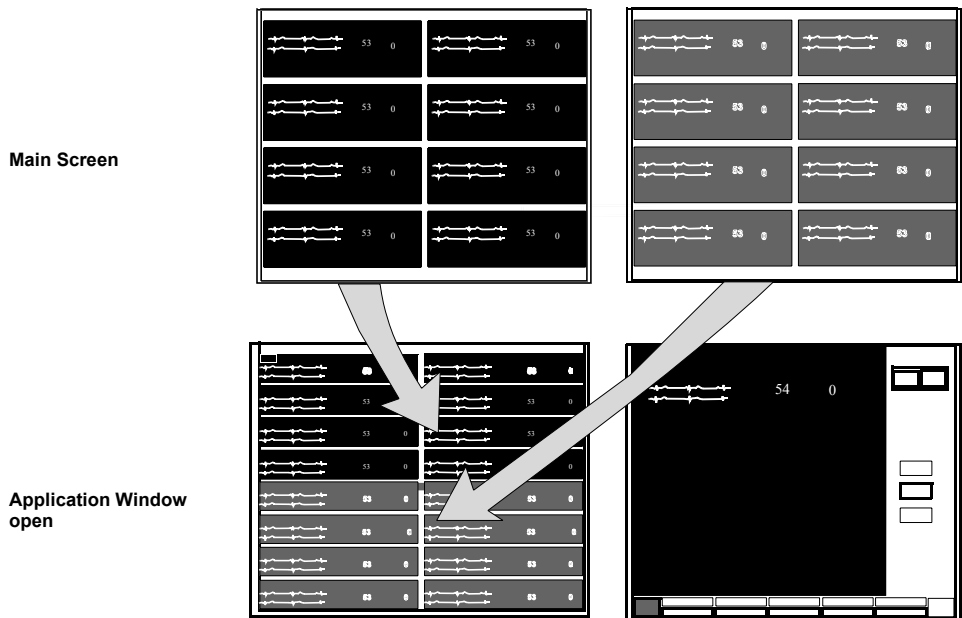
Dual Displays Dual displays offer the advantage of enabling clinicians to view the Patient Window and the data review applications on a full screen. You can view up to 7 waves at a time (may be up to 6 with EASI ECG). A dual display system can be configured with one or with two main screens.

One Main Screen

One display is used for the Main Screen, and the other is used for a full-screen Patient Window or application window.




Two Main Screens

- Both displays have patient sectors when Main Screen is active. For example, for a 16-patient Information Center, the Main Screen of each display includes 8 sectors. This feature is available for 8, 12, and 16-patient Information Centers.
- When an application window is open, all the sectors move to one display, and the second display has the full-screen application window. To remove the application window, select the Main Screen button.



**Information/
Icons on the
Patient
Window**

Some of the information/icons that can be displayed in the patient sector also appear on the Patient Window:

- Telemetry icon  -- upper left corner
If the telemetry device is connected to the TeleMon, the icon will have a box around it.
- Wireless bedside icon  -- upper left corner.
- Paired icon  -- upper left corner.
- Screen Notes (if available) -- all text that was entered in the Admit Window -- bottom of sector.
- Paced indicator (if applicable) -- upper left corner.

**Adjustments
on the Patient
Window**

Depending on the equipment assigned to a sector, clinicians can make the following adjustments on the Patient Window to parameters:

- Telemetry beds
 - the lead/label for the primary and secondary ECG lead.
 - the V lead label (6-lead only). For Va or Vb, select Va or Vb, then select the lead label corresponding to the V lead position on the patient.
 - the size of the primary and secondary ECG waves (on the display and recordings).
 - the heart rate alarm limits.
 - SpO2 alarm limits (if SpO2 is on).
 - initiate a spot check measurement. Move the cursor over the SpO₂ label. Then click on the Spot Check icon (finger with sensor).
 - NBP alarm limits (telemetry devices docked at TeleMon only).
- Bedside monitors with EASI ECG capability
 - the size of the primary and secondary ECG waves (on the Information Center display and recordings)
- IntelliVue Patient Monitors
 - the size of the ECG waves (on the Information Center display and recordings)
 - the heart rate alarm limits
 - initiate NBP measurement(s)

Note—If EASI ECG is being used, the label “EASI” is displayed below the primary waveform.

Patient Window Buttons

The Patient Window provides the following buttons that allow you to perform actions within the Patient Window:

Button	Description
Continuous Recording	Allows you to select waves to continuously record.
Stop	Stops any continuous recording in progress.
Suspend/Pause Alarms and Unsuspend/Resume Alarms (telemetry only)	Allows you to temporarily prevent auditory alarm signals from sounding at the Information Center. <i>Note</i> —When a telemetry device is paired to an IntelliVue Patient Monitor for bedside viewing of telemetry data, suspending/ pausing alarms at the Information Center suspends both the telemetry alarms and the bedside alarms. See “Pairing/Unpairing Telemetry Equipment” on page 2-31 for information on pairing telemetry equipment with a bedside monitor.
Arrhythmia Analysis	Displays up to two “live” delayed waves, with beat labels. The beat labels represent analysis of both the primary and secondary waves. See Chapter 5, “ST/AR Arrhythmia Monitoring” for additional information on arrhythmia monitoring.
Multilead ECG (if not using EASI ECG)	Displays a snapshot of up to six leads of ECG, plus a 10-second rhythm strip. You can use this window to verify that the ECG waves are optimized for arrhythmia monitoring.

Button	Description
12-Lead ECG (if using EASI ECG)	Displays the 12 leads derived from the EASI ECG system, plus a 10-second rhythm strip. From this window, you can print a 12-lead report.
More Waves	Displays additional waves, if available. If none available, displays the Arrhythmia analysis data (see “Arrhythmia Analysis”, above).

Application Buttons

When the Patient Window or an application window is open, a “task bar” at the bottom of the screen allows access to other Information Center applications for that bed. There are two rows in the task bar.

Top Row

The buttons in the top row change with the active application to provide access to related applications. The buttons in the table below appear on the Patient Window.

Button	Description
Discharge	Accesses the Discharge Window to clear the patient data and return alarm limits controlled at the Information Center to unit settings.
Sector Setup	Accesses the Sector Setup Window to clear the sector and assign an overview bed. Additional functionality depends on whether the Information Center is fixed or flexible. See “Fixed and Flexible Monitoring” on page 2-28.

Button	Description
Standby	Accesses the Standby Window, enabling you to suspend monitoring for telemetry, M3 beds, and IntelliVue Patient Monitors when the patient is temporarily off the unit or out of antenna range. Enables you to resume monitoring when the patient returns. For bedside monitors other than the M3 or IntelliVue Patient Monitor, you must put bedside monitor in Standby and resume monitoring at the bedside.
Wave Review	Accesses full disclosure.

Bottom Row

The buttons in the bottom row are available no matter which application is active.

Button	Description
Arrhythmia Alarms	Accesses a window to adjust arrhythmia monitoring for a patient. This button is not available for M3 monitors
Trend Review	Accesses graphical and/or tabular trends.
Alarm Review	Accesses stored alarm events and user-saved strips.
Admit	Accesses the Admit Window to enter the patient name and other data.
All Controls	Provides access to the full array of clinical and support functions.

Note—A list of the applications associated with each button is displayed when the mouse cursor rests on the button for approximately 10 seconds.

Basic Task Buttons

In addition to the buttons in the task bar, the following basic task buttons are always available, no matter which window is open.

Button	Description
Main Screen	Closes the open window and brings you back to the resting display.
Patient Window	Brings up the Patient Window when another application is open.
Patient List	Allows you to switch the patient in the open window (the application does not change). See “Viewing a Bed Temporarily” on page 1-33.
Print	<p>If a printer is available, starts a printout of the screen or a report. This key is available only for the Arrhythmia Analysis and Multilead ECG Patient windows, data review applications, and unit settings windows.</p> <p><i>Note</i>—If a printer is not available or is not configured, the print key is greyed out.</p>
Help	Brings up the on-line Help Window (see “Using the On-line Help” on page 1-39).

Using Standby

Overview

Standby is used to suspend monitoring for a patient. Control of the Standby function depends on the monitoring device being used.

With Telemetry, M3 and IntelliVue Patient Monitors

Standby is used to temporarily suspend monitoring, for example, when the patient goes out of antenna range. In addition, when the patient is discharged, the bed can be put in Standby until the new patient is connected.

Task Summary

Place the bed in Standby and resume monitoring by performing the following steps:

Step	Action
1	On the Patient Window, select the Standby button.
2	<p>For TRx and TRx⁺ transceivers, depending on your system's configuration, select the duration of the standby period (10, 20 or 30 minutes; 1, 2, 3 or 4 hours; or infinite).</p> <p><i>Note</i>—If the patient will be discharged, select infinite as the standby duration. When the new patient is connected select the Resume Monitoring in the appropriate patient sector or press the Check button on the transceivers.</p>

Step	Action
3	<p>Specify the appropriate location, then select Suspend Monitoring. The message “TELEMETRY STANDBY” or “MONITOR STANDBY” and location, if selected, are displayed in the sector.</p> <p><i>Note</i>—For telemetry devices paired with a IntelliVue Patient Monitor selecting Suspend Monitoring suspends monitoring for both the telemetry device and IntelliVue Patient Monitor. The message that displays in the sector is “TELEMETRY STANDBY”. See “Pairing/Unpairing Telemetry Equipment” on page 2-31 for information on pairing telemetry equipment with a bedside monitor</p>
4	<p>For TRx and TRx⁺ transceivers, if the standby period:</p> <ul style="list-style-type: none"> • Has expired when the patient returns to the unit, monitoring will resume automatically. Press the Check button on the transceiver to verify the resumption of monitoring. • Has not expired when the patient returns to the unit, monitoring must be reactivated manually. Either select Resume Monitoring at the Information Center or press the Check button on the TRx and TRx⁺. An audible tone at the TRx and TRx⁺ verifies that monitoring has resumed.
5	<p>For M3, IntelliVue Patient Monitor and telemetry devices other than the TRx and TRx⁺ transceivers, take the bed of Standby by placing the cursor in or by touching the sector and selecting the Resume Monitoring button.</p>

**With Other
Bedside
Monitors**

The bed is put in Standby and taken out of Standby at the bedside monitor. At the Information Center, you can select the location that is displayed in the sector, along with the Standby message.

Task Summary

Select the Standby location by performing the following steps:

Step	Action
1	<p>On the Patient Window, select the Standby button. Specify the standby location by selecting a location from the list. The “MONITOR STANDBY” message and location, if selected, are displayed in the sector.</p> <p><i>Note</i>—At the Information Center, when the cursor is placed in the sector or the sector is selected on a touch screen display, a Resume Monitoring button displays. Selecting it reminds you to take the bed out of Standby.</p>

Making Remote NBP Measurements

Overview

The Information Center allows you to remotely initiate an NBP measurement at the IntelliVue Patient Monitor from the Information Center.

Task Summary

To make NBP measurement(s) from the Information Center:

Step	Action
1	In the Patient Window for the appropriate patient, place your cursor over the NBP parameter. A pop-up box displays.
2	Select the Start button from the pop-up box or select the Stat button to make Stat measurements. <i>Note</i> —Depending on your bedside configuration, selecting Start initiates either a single measurement or an automatic cycle.
3	Select Stop to stop any ongoing bedside NBP measurement (manual or timed). Timed measurements will resume on the next time period. Select to Stop All to stop any ongoing NBP measurement and to stop any future timed measurements.

EASI 12-lead Review and Report

Overview

If the monitoring device has EASI 12-lead capability, you can view all available leads from the Patient Window. In addition, you can request a 12-lead report.

Note—EASI derived 12-lead ECG’s and their measurements are approximations to conventional 12-lead ECG’s and should not be used for diagnostic interpretations.

Task Summary

Display the 12-leads and print a report by performing the following steps:

Step	Action
1	On the Patient Window, select the 12-Lead ECG button. A 2.5 second ECG wave is displayed for each of the derived 12 leads. <i>Note</i> —It is not possible to display the derived 12-lead waves if there is an technical INOP condition in any lead. To view the EASI AI, AS, and ES leads, select 3 EASI Leads.

Step	Action
2	<p>To:</p> <ul style="list-style-type: none">• View the most recent ECG data -- select Update Waves.• Change the wave layout -- click on or, for touch screen displays, touch the wave layout on the top right side of the window then select the wave format (3x4, 6x2, or 12x1) from the list that displays. In 3x4 layout an additional rhythm lead displays.• Change the size of the waves -- click on or, for touch screen displays, touch the cal bar then select the size of the wave you want from the list that displays (x1/2, x1, x2, x4).• Change the wave speed (25 mm/s or 50 mm/s) -- click on or, for touch screen displays, touch the speed on the bottom right of the window and select the speed from the list that displays. When you select a different speed the window re-displays with the selected speed.
3	<p>To print a report select the Print button at the top of the window. The report shows all of the monitored vital signs, the 12 leads, and the high pass and low pass bandwidth frequencies with:</p> <ul style="list-style-type: none">• 3 rows x 4 columns -- showing 12 2.5-second waves and a 10-second rhythm strip at the bottom of the page• 6 rows x 2 columns -- showing 12 5-second waves• 12 rows x 1 column -- showing 12 7-second waves.

Viewing Other Patients over the IntelliVue Clinical Network

Overview

Information Centers and Clients on the IntelliVue Clinical Network enable you to view both real-time and stored patient data for patients monitored by other Information Centers on the IntelliVue Clinical Network.

There are two ways to do this:

- *View the bed temporarily*, in the Patient Window
You select the patient via the Patient List. You can then monitor the patient or review the data for that bed until you change to another patient or go to the Main Screen. If configured, you may also be able to admit, discharge, and transfer data for that bed.
- or
- *Overview a bed* in a sector on your Information Center
You use Sector Setup to overview a bed that is monitored by another networked Information Center. The actions allowed for overview beds depend on how the system is configured. See “Types of Access” on page 1-34.

Viewing a Bed Temporarily

You can view data temporarily for any bed monitored by another networked Information Center. This feature enables you to view patients that are in other clinical units or that are being monitored by another Information Center in your unit.

Task Summary

View other patients temporarily by performing the following steps:

Step	Action
1	Select the Patient Window button <i>in any sector</i> to bring up a Patient Window.
2	On the Patient Window, click or, for touch screen displays, touch the bed label on the left of the title bar to display the Patient List. The beds listed are those that are displayed <i>on this Information Center</i> .

Step	Action
3	Select the button to the left of the Patient List for the unit you want. The Patient List will now contain all beds currently monitored <i>in the unit</i> you selected. <i>Note</i> —Select your unit name to access patients on other Information Centers in your unit.
4	Select on the bed you want. That patient’s data will be displayed in the Patient Window. You can then access any other window for that patient.
5	You can then access data for another patient or select Main Screen to remove the window. <i>Note</i> —You don’t have to return to the Patient Window. For example, if you are on the Alarm Review Window, you can remain there and change the patient you are viewing. Other windows you access will then be for that patient.

**Overview
Beds**

You can overview a bed on your Main Screen that is monitored by another networked Information Center. See Chapter 2, “Patient Management” for information on assigning overview beds.

**Types of
Access**

Each Information Center on the IntelliVue Clinical Network can be configured to specify the following types of access control of beds monitored by another Information Center:

- Full Control (read-write) access -- you can view patient data and change measurement controls (such as alarm limits).
 - Telemetry Setup controls are for that Information Center only.
 - Functions that affect the Information Center as a whole, rather than a specific bed, such as volume control are accessible for the local Information Center only.
- Read-Only access -- you can view patient data, but measurement controls cannot be changed. The controls that are available are:
 - Record button in the Patient Sector
 - Continuous Recording in the Patient Window
 - Arrhythmia Analysis Windows -- Update Waves (but not Relearn)

- Alarm Review -- navigation and record or print alarm.
- Event and Wave Review -- navigation.
- Trend Review -- navigation.
- ST Review -- navigation, superimpose
- Record All (from All Controls)
- Sector Setup
- No access -- you cannot access any bed on that Information Center.

Full Control if Multiple Viewers

Since more than one Information Center can have access to a bed at the same time, there may be situations when two or more clinicians are viewing information for the same patient at the same time. If multiple clinicians have full control access to the same patient, then, in general, the last operation wins.

Optimizing Wireless System Performance

Overview

Bedside monitors with a wireless connection to the IntelliVue Clinical Network have their advantages, however the flexibility the wireless link offers is not without its challenges. The reliability and quality of the wireless signal transmission through the air and hospital walls are governed by a number of variables that can be difficult to control. A wireless connection from a bedside cannot be as dependable as a wired connection.

The effect of low signal strength and interference on the display of the patient information from a wireless bedside at the Information Center can range from a momentary period to a lengthy period of data loss. Although data loss due to the wireless link may be occurring at the Information Center, monitoring and alarming continue at the bedside (this differs from telemetry where monitoring and alarming occur in the Information Center, so when data loss due to the wireless link occurs, monitoring cannot continue).

Minimizing Data Loss

In order to minimize data loss at the Information Center due to low signal strength and interference, there are several things a hospital should do.

Low Signal Strength	Devices called “Access Points” are used to receive the radio signals from the bedsides. A wireless bedside must be within the coverage area of an associated access point for proper operation. When a wireless bedside is taken out of the designated coverage area, data loss at the Information Center will increase.
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Warning

Interference	Various equipment and/or electrical or medical devices that operate in the 2.4 to 2.48 GHz range could interfere with radio transmission of important medical data to the Information Center. Facilities utilizing wireless devices need to manage the use of these devices for safe operation.
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The effect of interference on the amount of data loss at the Information Center depends on the strength, type and proximity of the interfering device to the wireless bedside or access point. Any wireless device operating between 2.4 and 2.48 GHz can cause interference with the monitoring wireless network. Likely sources of interference include microwave ovens, other vendors’ wireless networks, wireless telephone headsets, certain cellular telephones, handheld computers, transceiver devices, and Bluetooth devices. In cases where the source of interference is known, removing the device or moving it away from the wireless bedside or access point will improve the system’s performance.

Since the wireless network used for monitoring emits radio frequencies, it is also possible for it to interfere with other devices (for example, programmers for cardiac pacemakers). Contact the manufacturers of other equipment used in the vicinity of the monitoring wireless network for information on possible susceptibility to these frequencies.

It is the hospital’s responsibility to keep track of all of the wireless devices in use in the hospital, and manage their use for safe operation.

Wireless System Messages

The system continually monitors the signal quality sent from wireless monitors. When data transfer from one or more monitors across the wireless link is compromised due to interference or too many transmitting devices, the system displays one of the following messages at the top of the screen.

Message	Possible Cause	What to Do
Excessive wireless data loss	Data loss (no signal or excessive dropout of signal) because of too many monitors using an Access Point, excessive interference, or weak signal.	<ul style="list-style-type: none"> • Turn off unused monitors. • If a microwave is in use, move monitors away from the microwave signals. • Locate and remove source of interference. • If condition persists, contact service.
Excessive wireless interference	Dropout of signal on one or more monitors due to interference of the signal, e.g., microwave oven interference.	<ul style="list-style-type: none"> • Make sure all microwave ovens are turned off or at least 20 feet from the monitors. • Turn off unused monitors. • Locate and remove source of interference. • If condition persists, contact service.
Weak radio signal	Excessive occurrence of dropped messages and weak (wireless) radio errors have occurred between one or more wireless M3/M4 bedsides and an access point. This could happen due to a device being marginally out of range of an access point or because of some signal attenuator, for example a monitor being behind a large metal cabinet.	<ul style="list-style-type: none"> • Move the monitor within range of an access point. • If condition persists, contact service.

Message	Possible Cause	What to Do
Wireless Monitoring Loss - Call Service	Indicates there may be intermittent disruption or failures in communication between one or more patient monitoring wireless devices and the Information Center.	<ul style="list-style-type: none">• Check the Wireless Status Log for specific information about the communication disruption.• See the <i>IntelliVue Telemetry System Instructions</i> for Use for corrective actions.• Call Service.

Configuration

The Information Center Software is shipped with factory defaults. At installation, (or at any time after installation), the Information Center Software can be configured with defaults for the unit in which it is installed.

In addition, adjustments such as changes to alarms being stored and recorded can be made on a per patient basis.

See Chapter 9, “Information Center Configuration,” for a list of factory defaults and configuration choices.

Using the On-line Help

An on-line Help feature is always available to answer questions and provide information on using the Information Center. To get Help on a specific window or application on any Information Center window, select the **Help** button. In the Help windows, text in blue (and underlined) indicates that you can select it and get more information.

In the Help window, do the following:

Select	To
Contents	View the table of contents for the online Help. Click each book to display pages that link to topics, and click each page to display the corresponding topic in the right pane.
Index	Search for specific words or phrases or select from a list of index keywords. Click the keyword to display the corresponding topic in the right pane.
Print	Print the topic currently displayed. <ol style="list-style-type: none">1. Select Print on the top left side of the help window. The print dialog opens.2. Specify whether to just print the selected topic or print the topic and all its associated subtopics by selecting the appropriate radio button.3. Select OK.4. Select Print to print the topic(s) to the specified printer.

2

Patient Management

This chapter describes how to manage patient data using the Information Center. It includes the following sections:

- Introduction. 2-2
- Admitting a Patient. 2-3
- Changing Patient Information. 2-9
- Resolving Conflicts with M3 or IntelliVue Patient Monitors 2-10
- Care Groups 2-13
- Discharging a Patient 2-19
- Discharging for Transport. 2-22
- Transferring Patient Data to a New Bed. 2-24
- Fixed and Flexible Monitoring 2-28
- Assigning a Bed and/or Equipment to a Sector 2-29
- Pairing/Unpairing Telemetry Equipment 2-31
- Assigning an Overview Bed to a Sector. 2-38
- Changing Equipment for a Sector. 2-35
- Clearing (Unassigning) a Sector. 2-40
- Assigning a Secondary Wave 2-42

Introduction

The Information Center provides the following applications to manage patients:

Application	Description
Admit	The Admit application connects all stored data to a patient’s name and puts the name on the display, recordings, and reports. See “Admitting a Patient” on page 2-3 for information on admitting patient to the Information Center.
Discharge	The Discharge application clears a patient’s name and data from the Information Center database and returns <i>Information Center</i> settings to unit defaults. See “Discharging a Patient” on page 2-19 for information on discharging patients.
Sector Setup	The Sector Setup application allows you to: <ul style="list-style-type: none">• Assign a bed and or equipment to a sector (flexible monitoring only). See page 2-29.• Associate (pair) a telemetry device with an IntelliVue Patient Monitor for bedside viewing of telemetry data. See page 2-31.• Change the equipment for a sector (flexible monitoring only). See page 2-35.• Assign an overview bed to a sector. See page 2-38.• Unassign (clear) a sector. See page 2-40.• Choose the secondary waveform that will display in the patient sector. See page 2-42.

For patients connected to M3 and IntelliVue Patient Monitors, you can admit, discharge, transfer, or update patients from either the bedside or the Information Center. When you admit or discharge a patient being monitored by an M3 or IntelliVue Patient Monitor on the Information Center that patient is also admitted or discharged on the bedside.

Note—A related application is Stored Waves. When the patient is first connected (or at any time) you can change the waves that are stored in the database. See “Changing the Waves that are Stored” on page 6-53 for more information.

Admitting a Patient

Overview

You must admit a patient to the Information Center in order for the name to appear on the display, recordings, or reports. You admit a patient by using the Admit Window.

With M3 or IntelliVue Patient Monitors

For patients connected to a M3 or a IntelliVue Patient Monitor you can admit the patient at either the bedside or at the Information Center. When you admit the patient on the Information Center that patient is also admitted to the bedside monitor. The patient name, medical record number, paced status, patient category, screen notes, and Care Group assignment are communicated to the bedside monitor. For IntelliVue Patient Monitors the additional fields of patient weight, height, gender, and date of birth are communicated to the bedside.

With Other Bedsides

The Information Center communicates a patient’s name and medical record number to the bedside monitor. Other patient information must be entered at the bedside, however. Information entered on the Admit window at the bedside monitor is not displayed at the Information Center.

**Task
Summary**

Since data collection starts when a patient is connected to the monitor, it is important that you perform a discharge prior to connecting a new patient. See “Discharging a Patient” on page 2-19 for information on discharging patients.

Admit a patient to the Information Center by performing the following steps:

Step	Action
1	<p>On the Patient Window for the bed you want to admit, select the Admit button.</p> <p><i>Note</i>—If the bed to which you want to admit this patient does not appear on the display and you have flexible monitoring, you can display the bed by using the Sector Setup Window. See “Assigning a Bed and/or Equipment to a Sector” on page 2-29.</p>
2	<p>If this patient is on telemetry, be sure the label on the telemetry device matches the label in the Equipment field.</p> <p>If the label does not match and you have:</p> <p>Fixed Monitoring You must either change the telemetry device or admit to the bed label with that telemetry device assigned to it.</p> <p>Flexible Monitoring If another patient is not currently admitted to a bed assigned to this equipment, you can assign the equipment to this bed by using the Sector Setup Window. See “Changing Equipment for a Sector” on page 2-35.</p>

Step	Action
3	<p>On the Admit Window specify a patient to admit by either:</p> <ul style="list-style-type: none"> <li>• typing a 1- to 18-character first and last name in the appropriate Patient Name fields. Only the last name is required. You can use the Tab key to move from field to field. To avoid any potential conflicts, be sure to enter a unique patient name in the name fields. <li>• selecting a patient name in the Transfer List. If the patient was discharged from a different care unit, first select the unit, then the name. See “Transferring Patient Data to a New Bed” on page 2-24. The Transfer List contains a listing of up to four discharged patients per Information Center for which data from previous monitoring has been saved. When you select a name from the Transfer List and then select the Admit Patient button, any data since you began monitoring will be erased, and the saved patient data will be retrieved. If you want to keep the current monitoring data, do not use the Transfer List. <li>• selecting a name from a hospital information system, if available. To select a name from a hospital information system: <ul style="list-style-type: none"> <li>a. Select the name of the hospital information system from the Transfer List drop-down menu. <li>b. Obtain a list of hospital-admitted patients by selecting the Retrieve button. A list of hospital-admitted patients displays on the left-side of the window. You can narrow the list by entering a full or partial last name and/or a full or partial medical record number then selecting the Retrieve button. <li>c. Highlight the name of the patient you wish to admit. The Information Center automatically fills in the patient’s first and last name and medical record number in the Admit window. If the other fields, for example, patient category, date of birth, height, weight, or gender are available then they are transferred to the Admit window as well. <li>d. If there is no match provided in the list box modify your search or provide patient information by using another method.

Step	Action
4	Enter a 1- to 12-character medical record number for this patient in the Medical Record Number field. The Information Center communicates the medical record number to the bedside monitor.
5	<p>If the patient has a cardiac pacemaker (including demand, fixed, or any type), select Patient Paced to display a checkmark in the box. This enables the ST/AR algorithm to detect and reject pace pulses (spikes) from the HR count.</p> <hr/> <p>Warning</p> <hr/> <p>If you do not have a checkmark in the Patient Paced box, pace pulses could be detected as beats and the monitor may not alarm for an asystole condition. Keep pacemaker patients under close observation. See Chapter 5, “ST/AR Arrhythmia Monitoring,” for specific warnings about monitoring paced patients.</p> <hr/> <hr/> <p>If the patient is on a bedside monitor, and arrhythmia analysis is off, this field is greyed out.</p>
6	<p>Specify what type of patient this is in the Patient Category field. Your choices include:</p> <ul style="list-style-type: none"> • Adult • Pediatric (if selected, telemetry ST monitoring is not available) • Neonatal (bedside monitors only) <p>The patient category you select affects arrhythmia analysis and alarm limits. If the patient category is changed for a bedside monitored patient be sure to check the alarm settings at the bedside.</p> <p>Note—For M3 and IntelliVue Patient Monitors, changing the patient category does not change alarm limits. You should check for correct alarm limits at the bedside monitor.</p>

Step	Action
7	<p>Specify the patient's birth date in the Date of Birth field. You can specify the date by entering a numeric date or by selecting the date on the calendar.</p> <p><i>Note</i>—The calendar only allows you to specify the birth date by selecting the appropriate date on the calendar. You cannot enter text into the calendar.</p> <p><i>Note</i>—For systems with the ability to export ECG waveform data from the Information Center to an Zymed Holter for Windows™, if you do not specify a date in this field the Information Center will use the default settings when exporting the ECG waveform data to the Holter system. Default settings are:</p> <ul style="list-style-type: none"> • Adult—January 1 current year minus 50 years • Pediatric—January 1 current year minus 5 years • Neonatal—current date
8	<p>Enter the patient's weight in the Weight field. Depending on how your system is configured, valid values are:</p> <ul style="list-style-type: none"> • Adult/Pediatric— 0 to 999 lbs or 0 to 450 kg • Neonatal—0 to 9999 g
9	<p>Enter the patient's height in the Height field. Depending on how your system is configured, valid values are 0 to 99 in or 0 to 250 cm.</p>
10	<p>Specify a gender in the Gender field by selecting the gender using the drop down arrow.</p>
11	<p>If you would like to associate text (for example the physician's name) with this patient, enter the text in the Screen Notes field. You can enter up to 60 characters.</p> <p>The first 34 characters you enter will appear in the patient sector when in the Main Screen (if configured). All the text will display in the Patient Window.</p> <p><i>Note</i>—If the monitoring device is the M3 or IntelliVue Patient Monitor, the screen notes text will be displayed in the Admit window. If a previous screen note was entered, it will be overwritten by the text entered at the Information Center.</p>

Admitting a Patient

Step	Action
12	Assign this patient to a Care Group if desired by selecting the Care Group from Care Group field. See “Care Groups” on page 2-13.
13	Review all the fields to be sure they are correct then select the Admit Patient button. The Information Center admits the patient.

Changing Patient Information

Overview

You can change patient information such as patient’s name, Care Group assignment, and medical record number by using the Admit Window.

With M3 or IntelliVue Patient Monitors

For patients connected to a M3 or a IntelliVue Patient Monitor you can change the patient information at either the bedside or at the Information Center. When you change the patient information on the Information Center that information also changes on the bedside monitor. The patient name, medical record number, paced status, patient category, screen notes, and Care Group assignment are communicated to the bedside monitor. In general, any fields changed at either the Information Center or the M3/IntelliVue Patient Monitors will be copied to the other device. The last entry wins. For IntelliVue Patient Monitors the additional fields of patient weight, height, gender, and date of birth are communicated to the bedside.


Task Summary

Change patient information by performing the following steps:

Step	Action
1	On the Patient Window for the bed for which you want to change information, select the Admit button.
2	On the Admit Window change the patient information in the appropriate fields. For information on specific fields see “Admitting a Patient” on page 2-3.
3	When you have finished modifying the patient information select the Update button. <i>Note</i> —Changing the patient name affects all stored data, not just the data from the update time forward.

Resolving Conflicts with M3 or IntelliVue Patient Monitors

Overview

Since you can admit, discharge, or transfer patients from both the Information Center or the M3 and IntelliVue Patient Monitor, a possibility exists that the information between the two systems does not match. If user intervention is required a  icon displays in the patient sector for the patient when data between the Information Center and the bedside do not match. In addition, when in the Admit or Discharge windows, a Conflict Resolution screen will display on the Information Center where you can resolve the conflict manually.

Warning

It is important to resolve the conflicts as soon as they are identified. Failure to do so could result in using incorrect/confusing data to make clinical decisions. Certain settings, for example, Paced and Patient Category between the Information Center and the bedside may not match. If the Paced status setting is set incorrectly the system could mistake a pace pulse for a QRS and fail to alarm in the case of asystole. It is important that the Patient Category is set correctly so the ECG can be analyzed correctly and initial arrhythmia alarm limits set.

In addition if conflicts are not resolved as soon as they are identified patient identifiers (for example, patient name, medical record number) will not be available through Information Center Web.

Task Summary

When the Conflict Resolution window displays, resolve the conflict by performing one of the following:

If you want to	then . . .
Use the patient information from the Information Center.	<p>Select the Use Information Center button. The patient information is retrieved from the Information Center and you return to the Admit/Discharge/Transfer window.</p> <p>When you choose this option the Information Center settings, including patient category, are applied to the bedside monitor. Any stored bedside data is cleared. The patient category setting applies to the algorithms used to process incoming patient data.</p> <p>Verify that all bedside alarm settings, including arrhythmia alarm settings, are correct.</p>

If you want to	then . . .
Use the patient information from the bedside	<p>Select the Use Bedside Monitor button. The patient information is retrieved from the bedside and you return to the Admit/Discharge/Transfer window. When you choose this option the bedside settings are applied to the Information Center. Any stored Information Center data is cleared.</p> <p>Verify that all bedside alarm settings, including arrhythmia alarm settings, are correct.</p>
You do not want the patient information from either the Information Center or the bedside.	<p>Select the Clear and Begin New Patient button. Patient information and stored data at both the Information Center and the bedside is cleared and you return to the Admit/Discharge/Transfer window where you can enter new patient information.</p>

Note—In the event that a patient is admitted on both the IntelliVue Patient Monitor and the Information Center and there are no differences between patient name, medical record number, paced or patient category but there are differences for date of birth, gender, weight, or height the IntelliVue Patient Monitor bedside value is always used.

Care Groups

Overview

Care Groups allow you to associate one or more beds with a group. A single Care Group is assigned to one nurse who is responsible for multiple patients within a single care unit. A Care Group can have a specific color associated with it. When a color is assigned to a particular care Group the color appears as the background for the bed label on the Information Center. Color by bed label helps the nurse to quickly identify patients in his/her Care Group.

Up to 12 beds can be assigned to a single Care Group and there can be up to 18 Care Groups in a unit. When a bed is assigned to a Care Group the bed remains in that Care Group across equipment changes, standby/resume, patient admit or discharge, and power cycles. A bed assigned to a Care Group is removed from that Care Group when the bed is unassigned from the Information Center that was monitoring that bed or if the bed label is changed.

M3 or IntelliVue Patient Monitors

With M3 or IntelliVue Patient Monitors, you can use Care Groups to notify the nurse of any alarms for the patients in their Care Group through alarm overview at the bedside. In addition, the nurse can see the current alarm status of each of the patients within the same Care Group at the bedside (see your appropriate bedside user documentation for details).

With M3170 Patient Link Information Center

For M3 or IntelliVue Patient Monitors with the M3170 Patient Link Information Center the Auto Alarm settings are set to auto-alarm notification for red alarms and the Overview prompt sound enable. See Step 5 on page 2-15 for information on M3 and IntelliVue Patient Monitor Auto Alarm settings.

For M3 or IntelliVue Patient Monitors connected to an M3170 IntelliVue Patient Link with 12 or less beds assigned, all beds are assigned to the same care group. For an M3170 IntelliVue Patient Link Information Center with more than 12 beds assigned, beds assigned to the left side of display during configuration are assigned to the first care group and beds assigned to the right side of display are assigned to the second care group. The Caregroup are labeled: '#1' and '#2' respectively.

Setting up a Care Group

To set up a Care Group perform the following steps:

Step	Action
1	From the All Controls window select the Care Group button under Patient Management. The Care Group Settings window displays.
2	On the Care Group Settings window select the Setup tab.
3	If you are setting up a new Care Group select the New Care Group button then enter a 1 to 18-character name for the Care Group you are setting up in the Care Group Name field. To avoid any potential confusion when identifying Care Groups in the system, the name you specify in this field must be unique.
4	If you are modifying an existing Care Group select the Care Group name from the Care Group drop-down list.

Step	Action								
5	<div><p>If this is a Care Group with M3 or IntelliVue Patient Monitors, specify the Auto Alarm setting for this Care Group (see your bedside monitor user documentation) by selecting the appropriate radio button in the Overview Auto-alarm field. Choices are:</p><table><tr><th>Choice</th><th>Description</th></tr><tr><td>Disabled</td><td>Selecting this option turns off the Auto Alarm Pop-up feature at the bedside. <i>Warning</i>—If the bedside overview status bar is not enabled and Auto Alarm Pop-up is disabled, alarming beds will not be visible in overview at the bedside. Do not disable the Auto Alarm Pop-up if you use overview at the bedside as your primary monitoring source. You must enable Auto Alarm Pop-up at both the Information Center and the bedside in order for this feature to work. At the bedside, you can turn auto pop-up on/off on a per bed basis.</td></tr><tr><td>Red</td><td>Selecting this option causes an Auto Alarm Pop-up window to display at the bedside when beds in this Care Group have a red alarm condition.</td></tr><tr><td>Red and Yellow</td><td>Selecting this option causes an Auto Alarm Pop-up window to display at the bedside when beds in this Care Group have a yellow alarm condition or greater.</td></tr></table></div>	Choice	Description	Disabled	Selecting this option turns off the Auto Alarm Pop-up feature at the bedside. <i>Warning</i> —If the bedside overview status bar is not enabled and Auto Alarm Pop-up is disabled, alarming beds will not be visible in overview at the bedside. Do not disable the Auto Alarm Pop-up if you use overview at the bedside as your primary monitoring source. You must enable Auto Alarm Pop-up at both the Information Center and the bedside in order for this feature to work. At the bedside, you can turn auto pop-up on/off on a per bed basis.	Red	Selecting this option causes an Auto Alarm Pop-up window to display at the bedside when beds in this Care Group have a red alarm condition.	Red and Yellow	Selecting this option causes an Auto Alarm Pop-up window to display at the bedside when beds in this Care Group have a yellow alarm condition or greater.
Choice	Description								
Disabled	Selecting this option turns off the Auto Alarm Pop-up feature at the bedside. <i>Warning</i> —If the bedside overview status bar is not enabled and Auto Alarm Pop-up is disabled, alarming beds will not be visible in overview at the bedside. Do not disable the Auto Alarm Pop-up if you use overview at the bedside as your primary monitoring source. You must enable Auto Alarm Pop-up at both the Information Center and the bedside in order for this feature to work. At the bedside, you can turn auto pop-up on/off on a per bed basis.								
Red	Selecting this option causes an Auto Alarm Pop-up window to display at the bedside when beds in this Care Group have a red alarm condition.								
Red and Yellow	Selecting this option causes an Auto Alarm Pop-up window to display at the bedside when beds in this Care Group have a yellow alarm condition or greater.								

Step	Action
6	<p>Assign a color to this Care Group by selecting a color in the Assign Central Color field. The color you assign will appear as the background for the bed label on the Information Center.</p> <p><i>Note</i>—If you do not want to assign a color to this Care Group select the color black in the Assign Central Color field. When you select the color black no color displays as the background or the bed label.</p>
7	<p>If this is a Care Group with M3 or IntelliVue Patient Monitors, specify whether a prompt tone will be audible at the bedside when beds in this Care Group have an alarm condition by selecting the appropriate radio button in the Overview Prompt-Tone field. If you select Disabled, no tone will be audible at the bedside when a bed in this Care Group has an alarm condition.</p>
8	<p>Select the OK button. The Information Center sets up the Care Group with the choices you selected.</p>
9	<p>If you would like to set up another Care Group, repeat Steps 3 through 8.</p>
10	<p>When you are done setting up Care Groups return to the All Controls window by selecting the All Controls button on the bottom of the screen.</p>

Assigning a Beds to Care Groups

From the Admit Window

You can assign a specific patient to a Care Group when admitting the patient or updating patient information in the Admit window by selecting the Care Group from the **Caregroup** field. See page 2-3 for information on using the Admit window.

Note—You can unassign a patient from a Care Group when discharging the patient or by updating the patient information in the Admit window. See page 2-19 for information on unassigning a patient from a Care Group using the Discharge window and page 2-9 for information on changing patient information using the Admit window.

From All Controls

To assign a bed(s) to a Care Group from the All Controls window perform the following steps:

Step	Action
1	From the All Controls window select the Care Group button. The Care Group Settings Bed Assignments window displays with a list of all of the Care Groups for this unit and their bed assignments as well as a list of beds not currently assigned to a Care Group. In addition a colored box displays to the left of each Care Group name indicating the color currently assigned to this Care Group.
2	If you would like change the order of the beds for a Care Group, select a bed under the Care Group name then use the up-arrow and down-arrow as appropriate to change the order of the beds until the desired order is achieved. For M3 or IntelliVue Patient Monitors, the bed order you specify here effects the order of beds in Care Group overview bar at the bedside. Top to bottom order corresponds to left to right order in the overview bar. The order is also reflected in the list of beds in ‘my care group’ at the bedside.
3	Select the Care Group that contains the bed(s) you want to assign to a Care Group by selecting the plus symbol next to the Care Group name in the list on the left-side of the window. If the bed(s) is not currently assigned to a Care Group select Unassigned from the list.

Step	Action
4	Select the Care Group to which you wish to assign beds from the Care Group drop-down list on the right-side of the window.
5	If you would like to move all the beds from the Care Group on the left of the window to the Care Group on the right select the Move All>> button.
6	<p>To assign a bed to the Care Group highlight the name of the bed on the left then select Move >button. The Information Center assigns the bed to the Care Group specified in the Care Group drop-down list.</p> <p>You can select more than one bed by holding down the Shift key while highlighting the desired beds. You can assign up to 12 beds to a single Care Group.</p> <p><i>Note</i>—For M3 and IntelliVue Patient Monitors, the order in which you assign beds does not necessarily dictate the order in which they will display in the Care Group overview bar at the bedside.</p>
7	When you are done assigning beds to a Care Group return to the All Controls window by selecting the All Controls button on the bottom of the screen.

Discharging a Patient

Overview

Important—Discharging from the Information Center clears the Information Center database for a bed. At that point, data storage begins for that bed. For this reason, you should perform a discharge prior to connecting a new patient. This ensures that data from a previous patient is not mixed with the data from the new patient. It also ensures that alarm limits controlled at the Information Center go back to unit settings.

When you enter the Discharge Window, you are given the choice of saving, removing the patient data, or if this is an M3 or an IntelliVue Patient Monitor, discharging for transport.

If you save the data, the patient's name appears in the "Transfer List" in the Admit Window. It can then be retrieved if the patient is re-admitted, or, if the Information Center is connected via the IntelliVue Clinical Network or connected to a Large Network Central Database System, it can be retrieved if the patient is transferred to another unit.

If you discharge for transport, the Information Center discharges the patient on the Information Center and stores the patient data but does not discharge the patient from the bedside monitor. See "Discharging for Transport" on page 2-22.

With M3 and IntelliVue Patient Monitors

If this is a patient connected to an M3 or IntelliVue Patient Monitor, discharging the patient at the Information Center also discharges them from the bedside monitor and clears both databases. All monitor and measurement server settings are reset to their defaults including arrhythmia settings. With IntelliVue Patient Monitors your monitor can be set up with predefined monitor configurations called profiles. Depending on how your monitor is set up when you discharge a patient the monitor either continues with the previous profile, or resets to the default profile configured for that monitor. Refer to your bedside documentation for details.

**With Other
Bedsides**

If this is a bedside monitor other than the M3 or IntelliVue Patient Monitor, discharging a patient from the Information Center clears the patient name and medical record number at the bedside monitor. You must, however, discharge the patient at both the Information Center and the bedside monitor to clear both databases. Discharge the patient from the Information Center first, then from the bedside. When you discharge a patient from the Information Center, all pending reports are cancelled, arrhythmia alarm settings go back to Unit Settings and any screen notes are cleared. The settings for alarms controlled at the bedside (for example, HR limits) do not change -- to set these alarms back to the defaults, consult your bedside monitor documentation.

**Task
Summary**

Discharge a patient by performing the following steps:

Step	Action
1	From the Patient Window select the Discharge button.
2	<p>If your system is configured for flexible monitoring, you can remove the bed/equipment that is currently displayed in a sector when you discharge the patient, if desired, by selecting the Clear Sector checkbox.</p> <p><i>Note</i>—If you have flexible monitoring and want to use a telemetry device in a different bed, you must clear the sector after discharging the patient. If you don't, the telemetry device will not be available for any other bed.</p> <p><i>Important</i>—For M3/M4 or IntelliVue Patient Monitors, when you clear the sector the bed will no longer be available for Overview at other bedsides. See your user documentation for information on using Overview at the M3/M4 or IntelliVue Patient Monitor.</p>
3	Unassign the Care Group associated with this patient, if desired, by selecting the Unassign Caregroup checkbox.
4	Unassign any paging devices currently associated with this bed, if desired, by selecting the Unassign Paging checkbox. When you select Unassign Paging all of the paging devices currently assigned to this bed are removed.

Step	Action
5	<p>On the Discharge Window specify whether you want to save or remove the patient data associated with this patient after discharge or, if this is an M3 or IntelliVue Patient Monitor, to discharge for transport by selecting the appropriate button.</p> <p>Specify Save Data with Discharge (only available for admitted patients) if this patient will be transferred to another bed/unit or re-admitted soon and you want to save the data. If you are transferring the patient to a unit over a large network, select the unit to which to transfer the data by selecting the unit name in the Transfer Destination list before selecting the Save Data with Discharge button. The maximum number of patients for whom data can be saved is four per Information Center unless the Information Center is connected to the M3154 Database Server in which case the maximum number of patients is four times the number of Information Centers. Only select this option if the patient will be transferred/readmitted soon. If the list is full, the oldest patient data will be removed and the new patient data will be added.</p> <p>Specify Discharge and Remove Data if you want to discard the patient's data (the patient's name will not be available on the Transfer List).</p> <p><i>Note</i>—Selecting Discharge and Remove Data does not remove the Care Group assignment for this bed. If you would like to remove the Care Group assignment for this bed you must unassign the Care Group associated with this bed by selecting the Unassign Caregroup checkbox.</p> <p>Specify Discharge for Transport if this is an M3 or IntelliVue Patient Monitor and you are moving the patient to a new location with either the monitor or measurement server. See “Discharging for Transport” on page 2-22 for information on using this option.</p>
6	<p>When the Information Center prompts you whether you are sure you want to discharge this patient, select the OK button. The Information Center discharges this patient with the option you selected and returns you to the Patient Window.</p>

Discharging for Transport

Overview

For those times when you want to transport the patient and use the monitor at the new location a discharge option, Discharge for Transport, is available. The Discharge for Transport option is for patients being monitored by an M3 or IntelliVue Patient Monitor operating via a wired connection to the IntelliVue Clinical Network. The Discharge for Transport option discharges the patient on the Information Center and stores the patient data but does not discharge the patient from the bedside monitor. When you monitor the patient in a different location and reconnect the monitor to the network the bed will automatically be admitted on the Information Center at the new location.

Note—The Discharge for Transport option is not available for transporting patients to units connected to other database servers across a Large Network Central Database System.

Task Summary

To transport a patient using Discharge for Transport perform the following steps:

Step	Action
1	Prepare the patient for transport.
2	From the Patient Window select the Discharge button. The Discharge window displays.
3	If you have flexible monitoring, clear the sector by selecting the Clear Sector checkbox.
4	From the Discharge window select the Discharge for Transport button. The Information Center moves the patient data to the transfer list and the message “No patient admitted” displays in the bed’s sector. <i>Note</i> —Alternatively, the Transfer key on the M3 or IntelliVue Patient Monitor can be selected.

Step	Action
5	Disconnect the monitor from wall power and the network. If you transporting an IntelliVue Patient Monitor patient with a Measurement Server disconnect the Measurement Server from the monitor.
6	Move the patient with the monitor or Measurement Server to the new location.
7	If you have flexible monitoring, at the new location assign the bed label and monitor label by using Sector Setup window. See page 2-29 for information on assigning equipment.
8	Reconnect to wall power and the network at the new location. For patients with a Measurement Server, reconnect the Measurement Server to the new monitor. The Information Center retrieves the patient information from the monitor and re-admits the patient to the new bed.

Transferring Patient Data to a New Bed

Overview

The Information Center allows you to transfer a patient to another bed without losing patient data. Transferring data involves two steps; discharging the patient from the current bed using the Discharge Window; then re-admitting the patient to the new bed using the Transfer List in the Admit Window.

The sector for the destination bed must have equipment associated with it (bedside monitor or a telemetry device).

Note—If the Information Center is connected via Philips CareNet, the new bed must be on the same Information Center. If the Information Center is connected via the IntelliVue Clinical Network, the new bed can be on any Information Center on the IntelliVue Clinical Network or if the Information Center is connected via the Large Network Central Database System the new bed can be on any Information Center connected to the large network. A large network is a option where multiple database servers can be interconnected on the hospital network. This connectivity provides clinicians with the ability to transfer patients across care units that are on separate database servers. A patient can be transferred to any bed that does not have a patient admitted. However, both the bed and the equipment must be assigned to the sector to which you are transferring a patient. If no bed and/or equipment is assigned you must first assign the bed and/or equipment using the Sector Setup Window then transfer the patient. See “Assigning a Bed and/or Equipment to a Sector” on page 2-29.

Task Summary

Transfer data for a patient by performing the following steps:

Step	Action
1	On the Patient Window select the Discharge button.
2	If you are transferring the patient to a unit over a Large Network Central Database System, select the unit to which to transfer the data by selecting the unit name in the Transfer Destination list.

Step	Action
3	<p>If you have flexible monitoring and want to use this equipment for a different bed, you must clear the sector if you don't, the equipment will not be available for any other bed. Clear the sector upon discharge by selecting the Clear Sector checkbox.</p> <p><i>Note</i>—You can also clear the sector by using the Clear Sector page in Sector Setup -- see “Clearing (Unassigning) a Sector” on page 2-40.</p>
4	<p>On the Discharge Window specify that you want to save the patient data associated with this patient after discharge by selecting the Save Data with Discharge button.</p> <p>This ensures that patient data is retained and remains intact when the patient is moved to the new bed. The data that is saved includes:</p> <ul style="list-style-type: none"> • Patient's name and ID. • Alarm history (50 or 150 alarms). • Events, trends, ST data and full disclosure waves going back 24, 48, 72, or 96 hours. The amount of data that can be retrieved depends on when the re-admission is done. For example, if a patient is re-admitted 10 hours after discharge (and your system has 24 hour trend storage), 14 hours of trends are available on re-admission. <p><i>Note</i>—For bedside monitors other than the M3 or IntelliVue Patient Monitor, you still have to discharge the patient at the bedside monitor to clear the bedside database and reset bedside alarm limits.</p>
5	<p>When the Information Center prompts you whether you are sure you want to discharge this patient select the OK button. The Information Center discharges this patient and returns you to the Patient Window.</p>
6	<p>On the Patient Window select the Admit button.</p>

Transferring Patient Data to a New Bed

Step	Action
3	<p>If you have flexible monitoring and want to use this equipment for a different bed, you must clear the sector if you don't, the equipment will not be available for any other bed. Clear the sector upon discharge by selecting the Clear Sector checkbox.</p> <p><i>Note</i>—You can also clear the sector by using the Clear Sector page in Sector Setup -- see “Clearing (Unassigning) a Sector” on page 2-40.</p>
4	<p>On the Discharge Window specify that you want to save the patient data associated with this patient after discharge by selecting the Save Data with Discharge button.</p> <p>This ensures that patient data is retained and remains intact when the patient is moved to the new bed. The data that is saved includes:</p> <ul style="list-style-type: none">• Patient's name and ID.• Alarm history (50 or 150 alarms).• Events, trends, ST data and full disclosure waves going back 24, 48, 72, or 96 hours. The amount of data that can be retrieved depends on when the re-admission is done. For example, if a patient is re-admitted 10 hours after discharge (and your system has 24 hour trend storage), 14 hours of trends are available on re-admission. <p><i>Note</i>—For bedside monitors other than the M3 or IntelliVue Patient Monitor, you still have to discharge the patient at the bedside monitor to clear the bedside database and reset bedside alarm limits.</p>
5	<p>When the Information Center prompts you whether you are sure you want to discharge this patient select the OK button. The Information Center discharges this patient and returns you to the Patient Window.</p>
6	<p>On the Patient Window select the Admit button.</p>

Step	Action
7	<p>On the Admit Window, select the patient's name in the Transfer List.</p> <p><i>Note</i>—The names that are displayed when you first enter the Admit Window are the names of patients that were discharged from this Information Center. To see the names for all Information Centers in your care unit, select your unit name. To see names for Information Centers in another unit, select that unit name.</p>
8	<p>Select the Admit Patient button. The transfer is now complete.</p> <p><i>Note</i>—You cannot modify any of the patient data until after you select the Admit Patient button. Change the patient information, if needed, and select Update.</p> <p><i>Important</i>—When a patient is admitted from the Transfer List, the Paced status is not retrieved -- it is set to NO for all monitoring devices. If the patient is paced, change it after you select the Admit Patient button.</p>

Note—When transferring patients across a Large Network Central Database System you can check the status of the transfer in the Transfer Status window. Access the Transfer Status window by selecting the **Status Logs** button on the All Controls window then selecting the **Transfer Status** tab on the window that displays.

Fixed and Flexible Monitoring

Overview

The functions available to manage the beds on the Main Screen and the equipment for those beds depend on whether the Information Center is configured for fixed or flexible monitoring.

Changes are made through the Sector Setup Window. You can access the Sector Setup Window via the task bar button on the Patient Window or Patient Management applications, or via All Controls.

Fixed Monitoring

Fixed monitoring is typically configured for units where the number of beds equals the number of sectors on the Main Display. The equipment assigned to a sector cannot be changed.

With fixed monitoring you can temporarily view other beds in the Patient Window and you can choose the wave to display as the secondary wave in the patient sector. (See “Viewing a Bed Temporarily” on page 1-33 and “Assigning a Secondary Wave” on page 2-42 for instructions.)

In addition, if a sector is configured as an overview (blank) sector at installation, you can display any bed on the network. If the cursor is placed in an empty sector, the **Sector Setup** button is displayed. Selecting this button brings up the Overview Bed page, where you can select the bed.

Flexible Monitoring

With flexible monitoring, bed and equipment changes are possible. An example of a unit with flexible monitoring is the unit that has both bedside monitors and telemetry beds. Units may need to change patients back and forth between bedside monitoring and telemetry. Flexible monitoring allows you to make the appropriate equipment changes. Another example of a unit with flexible monitoring is the telemetry unit that has more beds than sectors on the Main Screen. Flexible monitoring allows the unit to make bed label changes as needed. For example, telemetry devices can be assigned to different beds as necessary.

If your system is configured for flexible monitoring, you can transition between SDN based equipment (for example, telemetry) and IntelliVue Clinical Network-connected wired and wireless bedsides on the same Information Center.

As with fixed monitoring, if your Information Center is connected to other Information Centers, you can use patient sectors to display overview beds for patients monitored by those Information Centers.

Note—All wireless M3 bedside monitors will **automatically** be configured for flexible monitoring.

Assigning a Bed and/or Equipment to a Sector

Overview

If your system is configured for flexible monitoring, the Information Center allows you to assign a bed and/or equipment to an empty sector. You assign a bed and/or equipment to a sector by using the Sector Setup Window.

If the sector is empty

When the cursor is placed in the sector, one button appears in the sector, **Sector Setup**. Selecting this brings you directly to the Assign Bed/Equipment page of the Sector Setup Window.

If there is a bed and equipment assigned

You must first use the Clear Sector page of the Sector Setup Window to clear the sector. See “Clearing (Unassigning) a Sector” on page 2-40. Then, you use the Assign Bed/Equipment page to assign the bed.

Note—You can use Assign Bed/Equipment to move a *telemetry-monitored* patient to another bed and preserve all settings (including alarm limits) as well as the patient's history. If this Information Center is connected via Philips CareNet, the new bed must be on a Information Center that is connected to the same CareNet switch. If this Information Center is connected via the IntelliVue Clinical Network, the new bed can be on any Information Center that is connected to the IntelliVue Clinical Network. You can do this whether or not the patient has been admitted.

You can access the Sector Setup Window via the task bar button on the Patient Window or Patient Management applications, or via All Controls

Task Summary

Assign a bed/equipment to a sector by performing the following steps:

Step	Action
1	On the Patient Window for the appropriate sector, select the Sector Setup button.
2	On the Sector Setup Window select the Assign Bed/Equipment page by selecting the Assign Bed/Equipment tab. <i>Note</i> —If you have flexible monitoring, this page displays automatically when you select Sector Setup for sectors that currently do not have a bed and/or equipment assigned to them.
3	Select the bed you want to assign to the sector by selecting a bed name from the list. <i>Note</i> —The only beds that appear in the list are beds not currently displayed. Some beds may not be from your unit. Be sure to select the correct bed label. If the equipment moves between multiple Information Centers, for example an M3 monitor, the equipment will need to be cleared from the other Information Center before you can assign it.
4	Select the equipment you want to assign to the sector by selecting the appropriate equipment from the list.
5	Once the necessary selections are made and verified, select the OK button. The Information Center assigns the bed/equipment to the sector. Once you have assigned equipment to the sector, you can admit a patient to that bed. See “Admitting a Patient” on page 2-3. <i>Note</i> —Selecting the Cancel button cancels your changes and returns you to the Assign Bed/Equipment page.

Pairing/Unpairing Telemetry Equipment

Overview

If your system is configured for flexible monitoring, the Information Center allows you to associate (pair) a telemetry device with an IntelliVue Patient Monitor (Release B.1 or higher) for display of telemetry data (waveforms, parameters, and alarms) as well as bedside parameters on the IntelliVue Patient Monitor. When paired, the telemetry data automatically displays as a permanent overview session in the Telemetry Overview window on the IntelliVue Patient Monitor. At the Information Center, the telemetry data and any bedside data (for example, NBP) are integrated in the patient sector. When you remove the telemetry/bedside pairing (unpair), the patient is assumed to be telemetry monitored.

See your *IntelliVue Patient Monitor Instructions for Use* for information on using the Telemetry Overview window at the IntelliVue Patient Monitor.

Parameter/ Wave Behavior

Because the bedside and telemetry device can potentially source the same parameters the following rules apply when a telemetry device and an IntelliVue Patient Monitor are paired:

- Telemetry parameters are labeled as HR, SpO2T and PulseT. Bedside parameters are labeled as HR, SpO2, SpO2l, SpO2r and Pulse.
- Telemetry pleth wave is labeled as PlethT. Bedside pleth wave is labeled Pleth.
- The HR and ECG waveforms from Telemetry are displayed and stored at the Information Center.
- Overlapping parameters and waveforms (for example, SpO2, SpO2T, Pulse, PulseT, Pleth and PlethT) are displayed and trended with the patient's data. Non-overlapping parameters and waveforms from the bedside (for example, ABP, CO) are displayed and trended with this patient's data.

- If TeleMon NBP is on, then the TeleMon NBP value is displayed and stored. The bedside NBP value is ignored. If only the bedside NBP is on, the bedside NBP is displayed and stored. If a bed is paired and has NBP and the telemetry device is also docked to a Telemon with NBP, then each respective NBP measurement is displayed and trended as if it came from a single source. NBP from Telemon only is shown in the Telemetry Overview window at the IntelliVue Patient Monitor.
- The Telemetry Overview window at the IntelliVue Patient Monitor reflects only the telemetry waveforms and parameters.
- The Telemetry Overview window indicates that the ECG and Pleth waveforms are delayed.
- Telemetry waveforms (for example ECG and Pleth) and waveforms sourced by the bedside (for example Pressures and Pleth) are not aligned in time when displayed together on the Information Center.

Alarm behavior

Both the IntelliVue Patient Monitor and telemetry device source alarms. The following describes the behavior from the Information Center's perspective.

- When paired, all bedside ECG and Resp INOPs are ignored by the Information Center.
- All bedside and telemetry alarms, all telemetry ECG INOPs and non-ECG INOPs are displayed, recorded, stored and reflected in overview (as appropriate) by the Information Center.
- When paired, alarm recordings at the Information Center use the primary and secondary telemetry waveforms.

Note—As with overview patients at the IntelliVue Patient Monitor, a prompt tone will be audible at the IntelliVue Patient Monitor when a telemetry alarm condition occurs.

**Control
behavior**

The following table indicates how bedside and Information Center controls apply when a telemetry device and an IntelliVue Patient Monitor are paired.

Where Initiated	Effect at Bedside	Effect at Information Center
Silence		
Bedside	Silences bedside alarms.	Silences bedside alarms.
Bedside from Telemetry Overview Window	Silences bedside and telemetry alarms.	Silences bedside and telemetry alarms. <i>Note</i> —Silence Overview Alarms at Bedside must be enabled at the Information Center. See “General Setup Unit Settings” on page 9-36.
Information Center	Silences bedside and telemetry alarms.	Silences bedside and telemetry alarms.
Telemon	No effect. Silences alarms at the TeleMon only.	No effect. Silences alarms at the TeleMon only.
Suspend/Pause		
Bedside	Suspends/Pauses bedside alarms.	Bed Alarms Suspend/Bed Alarms Paused INOP displayed.
Information Center	Suspends/Pauses bedside and telemetry alarms.	Suspends/Pauses bedside and telemetry alarms. Bed Alarms Suspend/Bed Alarms Paused INOP displayed. All ECG Alarms OFF and Tele Alarms Suspend/Tele Alarms Paused displayed.
Standby		
Bedside	Bedside put into standby state.	Monitor Standby INOP displayed
Information Center	Bedside and telemetry put into standby.	Monitor and Telemetry Standby INOPs displayed. Standby location displayed.
Unsuspend/Resume Monitoring		
Bedside	Bedside resumes monitoring	Telemetry Standby remains.
Information Center	Bedside resumes monitoring.	Telemetry resumes monitoring.

Task
Summary

To pair equipment in a blank sector:

Step	Action
1	On the Patient Window for the appropriate sector, select the Sector Setup button.
2	On the Sector Setup Window select the Pair/Upair Equipment page by selecting the Pair/Upair Equipment tab.
3	Select the bed label from the New Bed list.
4	Select the telemetry device from the New Equipment list.
5	From the New Pair Equipment list, select the bedside monitor to which you wish to pair the telemetry device.
6	When you have completed these steps, then click OK .
7	<p>To change equipment that is paired, you must first unpair the existing paired equipment by selecting the Unpair button You may then pair new equipment by selecting a monitor from the New Pair Equipment list.</p> <p><i>Note</i>—When you select the Unpair button the sector automatically defaults to the telemetry device. If you need to assign a bedside monitor to the sector go to the Assign/Bed Equipment page and assign the monitor to the sector.</p>

Note—After pairing the telemetry device and IntelliVue Patient Monitor verify that you are receiving the appropriate monitoring data in the Information Center and bedside monitor.

Changing Equipment for a Sector

Overview

If your system is configured for flexible monitoring, you can change the equipment that is currently assigned to a bed. You change the equipment assigned by using the Change Equipment page in the Sector Setup Window.

Note—You can identify the telemetry device label that is currently assigned to a bed by placing your cursor over the bed label in the sector. When you place your cursor over the bed label a pop-up box indicates the telemetry device label.

Patient Settings

When you change the equipment assigned to a bed a short gap occurs in the wave data for the patient and the following occurs to patient settings:

- **telemetry device to telemetry device**

All patient settings remain the same as before the equipment change.

If using Philips transmitters, the items controlled by the Wave Viewer or TeleMon depend on how the transmitter is set up. For example, the SpO₂ sample rate will be the one configured for the transmitter you are changing to.


- **Bedside monitors (other than M3/IntelliVue Patient Monitors) to telemetry**

All existing arrhythmia settings remain the same. Settings that were not previously being monitored (for example, SpO₂ and ST) default to the unit settings.

- **Telemetry to bedside monitor other than M3/IntelliVue Patient Monitor**


All existing arrhythmia settings remain the same. However, the local bedside settings for all other parameters, including high and low HR alarm limits, go into effect. In addition, if telemetry ST segment monitoring was enabled, it is turned off (ST monitoring can be enabled at the bedside, if it is available).

- **Bedside/Telemetry to M3/IntelliVue Patient Monitor**

All parameter settings will be those in the M3/IntelliVue Patient Monitor. If there are discrepancies in patient demographics, patient category or paced status a  icon will display in the upper right-hand corner of the patient sector to indicate that a conflict exists. You will need to go to the Admit Window and resolve the conflict. See “Resolving Conflicts with M3 or IntelliVue Patient Monitors” on page 2-10.

Note—Differences in the height, weight, date of birth, or gender fields at the Information Center and these fields at the IntelliVue Patient Monitor will not cause a conflict to occur. If there are differences between the height, weight, date of birth, or gender fields, then the IntelliVue Patient Monitor value is always used.

- **M3/IntelliVue Patient Monitor to M3/IntelliVue Patient Monitor**

All parameter settings will be those in the new bedside monitor. If there are discrepancies in patient demographics, patient category or paced status a  icon will display in the upper right-hand corner of the patient sector to indicate that a conflict exists. You will need to go to the Admit Window and resolve the conflict. See “Resolving Conflicts with M3 or IntelliVue Patient Monitors” on page 2-10.

Note—Differences in the height, weight, date of birth, or gender fields at the Information Center and these fields at the IntelliVue Patient Monitor will not cause a conflict to occur. If there are differences between the height, weight, date of birth, or gender fields, then the IntelliVue Patient Monitor value is always used.

- **M3 bedside monitor to telemetry**

All parameter settings will be those in the Information Center.

- **IntelliVue Patient Monitor to telemetry**

All existing arrhythmia settings remain the same, except the settings for Multilead, Singlelead, or Arrhythmia off. The Multilead, Singlelead, or Arrhythmia Off settings reflect the setting of the telemetry device when it was last used. Settings that were not previously monitored (for example, SpO2 and ST) default to unit settings.

Task Summary

Change equipment assigned to a sector by performing the following steps:

Step	Action
1	On the Patient Window for the appropriate sector, select the Sector Setup button.
2	On the Sector Setup Window select the Change Equipment page by selecting the Change Equipment tab. <i>Note</i> —If you have flexible monitoring, this page displays automatically when you select Sector Setup for sectors that currently have a bed and equipment assigned to them.
3	On the Change Equipment page select the new equipment you want to assign to this sector by selecting the Bedside Monitor or the telemetry device label on the new equipment list. <i>Note</i> —Only telemetry devices that are unassigned to a bed are in the equipment list. If the telemetry device you will be using to monitor a patient is not on the list, check that it is not assigned to a bed (put the cursor over the bed label to see the telemetry device number). If the telemetry device is assigned to a bed, use the Clear Sector tab to clear the sector. The telemetry device will then be available for assignment to the new bed. If the equipment moves between multiple Information Centers, for example an M3 monitor, the equipment will need to be cleared from the other Information Center before you can assign it.
4	Verify that the bed and equipment you have selected are correct, then select the OK button. The bed and/or equipment will be changed for the sector. If the Bedside Monitor you selected is an M3 or IntelliVue Patient Monitor proceed to Step 5. <i>Note</i> —Selecting the Cancel button cancels your changes and returns you to the Change Equipment page.
5	If the Bedside Monitor is an M3 or IntelliVue Patient Monitor verify that the patient information/settings in the Admit Window are correct. Resolve any conflicts if necessary. See “Resolving Conflicts with M3 or IntelliVue Patient Monitors” on page 2-10.

Note—If using Overview while equipment change is taking place, the data from these beds may momentarily not be available.

Assigning an Overview Bed to a Sector

Overview

If your Information Center is connected to the IntelliVue Clinical Network, you can assign an overview bed to a sector. An overview bed is a bed that is currently being monitored by another connected Information Center (the primary Information Center).

You assign an overview bed to a sector by using the Overview Bed page in the Sector Setup Window. Sectors that have no bed label assigned contain a **Sector Setup** button from which you can directly access the Sector Setup Window.

Fixed monitoring

You can overview a bed in a sector if a sector is configured as an overview (blank) sector at installation. If the sector already has an overview bed, you must clear the sector before assigning another overview bed. See “Clearing (Unassigning) a Sector” on page 2-40.

Flexible Monitoring

You can assign an overview bed to a sector for:

- Sectors that currently do not have bed/equipment assigned.
- Sectors that display a bed label but do not have equipment assigned.

Overview Bed Controls

The controls available when viewing an overview bed depend upon how your system is configured and whether you have Read-Only or Full Control access. Read-Only access means you can view the patient data but cannot make any changes. Full Control access means you can view the patient data and make changes. For more information, see “Types of Access” on page 1-34.

Task Summary

To assign a sector to a bed currently being monitored by another connected Information Center perform the following steps:

Step	Action
1	On the Patient Window for the appropriate sector, select the Sector Setup button.
2	On the Sector Setup Window select the Overview Bed page by selecting the Overview Bed tab. <i>Note</i> —If fixed monitoring, the Overview Bed page is automatically displayed for a blank sector.
3	Select the unit you want, then the bed you want to overview by selecting a bed name from the list.
4	Select the OK button. The Information Center assigns an overview bed to the sector. <i>Note</i> —Selecting the Cancel button cancels your changes and returns you to the Overview Bed page.

Clearing (Unassigning) a Sector

Fixed Monitoring

If your system is configured for fixed monitoring, you must clear the current overview bed before assigning another overview bed to that sector.

Flexible Monitoring

If your system is configured for flexible monitoring, you use Clear Sector to remove the bed/equipment that is currently displayed in a sector.

Note—If a patient is admitted to the bed, you must first discharge the patient before clearing the sector. See “Discharging a Patient” on page 2-19.

When the sector is empty, you can:

- Assign a new bed/equipment to monitor a bed.
- or
- Overview a bed being monitored by another connected Information Center.

Important—For M3/M4 or IntelliVue Patient Monitors, when you clear the sector the bed will no longer be available for Overview at other bedsides. See your user documentation for information on using Overview at the M3/M4 or IntelliVue Patient Monitor.

Note—Clearing a sector removes any telemetry/bedside pairings.

You clear a sector by using the Clear Sector page in the Sector Setup Window.

Task Summary

Clear a sector by performing the following steps:

Step	Action
1	On the Patient Window for the appropriate sector, select the Sector Setup button.
2	On the Sector Setup Window select the Clear Sector page by selecting the Clear Sector tab.

Step	Action
3	Select the OK button.
4	<p>On the confirmation box that displays select the OK button. The Information Center clears the bed/equipment assignment from this sector and returns you to the Main Screen.</p> <hr/> <p>Warning</p> <hr/> <p>Clearing a sector can stop monitoring for a bed. Therefore, be sure to check that the sector you will clear is no longer monitoring a patient.</p> <hr/> <p><i>Note</i>—Selecting the Cancel button resets the sector assignment to its initial condition.</p>

Assigning a Secondary Wave

Overview

For M3, IntelliVue Patient Monitors, and bedsides with telemetry devices you can select the secondary waveform to be displayed in the patient sector in the Secondary Wave window.

Note—If you have flexible monitoring and the patient sector is empty you must first assign a bed and/or equipment to the sector before you can select the secondary wave. See “Assigning a Bed and/or Equipment to a Sector” on page 2-29 for instructions.

Task Summary

Assign a secondary wave to display in a sector by performing the following steps:

Step	Action
1	On the Patient Window for the appropriate sector, select the Sector Setup button.
2	On the Sector Setup Window select the Secondary Wave page by selecting the Secondary Wave tab.
3	Select the wave to display by selecting the wave from the Select Secondary Wave drop-down list.
4	Select OK .

Recordings and Reports

This chapter describes the Information Center recordings and reports. It includes the following sections:

- Introduction. 3-2
- Making a Delayed Recording. 3-5
- Saving a Strip from the Patient Sector 3-8
- Making Real-Time Recordings. 3-9
- Controls and Indicators on the Philips M1116B 2-Channel Recorder Module 3-11
- Controls and Indicators on the M3160A 4-Channel Recorder 3-13
- Recording Priority. 3-14
- Recording Status Messages 3-15
- Annotation 3-17
- Loading Paper into the M1116B 2-Channel Recorder 3-19
- Loading Paper into the M3176C 2-Channel Recorder 3-22
- Loading Paper into the 4-Channel Recorder. 3-24
- Philips M1116B 2-Channel Recorder Connections 3-26
- M3160A 4-Channel Recorder Connections 3-28
- Ordering Information for Supplies for Recorders. 3-29
- Printing Reports 3-29
- Cleaning the Philips M1116B 2-Channel Recorder Printhead 3-31

Introduction

The intended use of the Philips Recorder is to provide hardcopy of text, graphics, and wave data for the Information Center.

You can initiate recordings and reports (if a printer is available) from the Information Center or from the bedside. See page 3-29 for bedside monitors from which printing requests cannot be made.

You can make recordings on the 2-Channel Recorder (M1116B or M3176C) or the M3160A 4-Channel Recorder if the 4-Channel Recorder is available on your system. Recordings can be automatically generated by alarm events or you can manually request them. Delayed recordings contain the primary and secondary waves selected at the bedside, or, for telemetry, on the Patient Window. Delayed recordings, for bedsides other than the Intellivue Patient Monitors, are always made on the 2-Channel Recorder (M1116B or M3176C). IntelliVue Patient Monitors can make delayed recordings on the 2-Channel Recorder or the M3160A 4-Channel Recorder if the 4-Channel Recorder is available on your system. Real time recordings can be made on the 2-Channel Recorder or the M3160A 4-Channel Recorder if the 4-Channel Recorder. The clinician selects the waves for real-time recordings. Continuous recordings can have overlapping waves. The 2-channel recorder speed is configured at 6.25mm/s, 25 mm/s, or 50 mm/s. The 4-channel recorder speed is configured at 12.5mm/s, 25 mm/s, or 50 mm/s,

The Information Center can be configured so that clicking in or, for touch screen displays, touching in the patient sector has the following action:

- initiates a delayed recording (not available on 4-channel recorders).
- saves a strip in Alarm Review and Event Review.
- both initiates a delayed recording and saves a strip.

The Philips Recorders are not intended for home use.

Rx only.

Types of Recordings

The following types of recordings can be made at the Information Center.

Recording	Description
Alarm	An alarm recording is a timed non-continuous recording that is generated automatically (if configured) when an alarm occurs. The recording shows waves both before and after the alarm was announced. Alarm recordings can be made continuous from the recorder and can be extended from M3 bedside monitors. Alarm recordings are made on the 2-Channel Recorder (M1116B or M3176C).
Delayed	A delayed recording is a timed non-continuous recording that shows waves both before and after it is initiated. Delayed recordings can be made continuous from the recorder, and can be extended from M3 bedside monitors. Delayed recordings are made on the 2-Channel Recorder (M1116B or M3176C).
Real-time	A real-time recording is a continuous recording that shows waves that occur after you request the recording. Real-time recordings must be manually stopped. Real-time recordings can be directed to the 2-Channel Recorder (M1116B or M3176C) or the M3160A 4-Channel Recorder if the 4-Channel Recorder is available on your system.
Procedure	A procedure recording is a timed recording made from the bedside (for example, cardiac output).

Alarm Recordings

You can turn off the recording of specific alarms in the Record/Store/Page Alarms Window. See “Chapter 4. Alarm Management and Setup”.

The waves that are recorded are based on the waves

- Primary wave (usually ECG)
- Wave corresponding to the alarming parameter. If only the primary wave is available, a 40-mm single-channel recording is generated.

Note—In order for an alarm recording generated from the M3 or the IntelliVue Patient Monitor to be made at the Information Center, the recording must be configured On at both the bedside and the Information Center (in the Record/Store Window). For M3 or IntelliVue Patient Monitors connected to the M3170 Patient Link Information Center, since the M3170 does not include a display the user does not have access to the Record/Store window, all recordings are configured On at the Information Center.

For SDN bedsides connected to the M3170 Patient Link Information Center, all red and yellow arrhythmia alarms are recorded at the Information Center. For SDN bedsides with the M3170 Patient Link Information Center, non-arrhythmia alarm recordings are controlled at the bedside.

Arrhythmia Alarm Recordings

If an arrhythmia alarm recording is running for a patient and other arrhythmia alarms occur for the same patient (with the same waves), the recording will be extended to include the superseding alarms.

Making a Delayed Recording

Overview

A delayed recording is a non-continuous, timed recording that shows waves prior to your record request along with a few seconds of waveforms after your request. You can make a delayed recording for one patient or for all patients. Delayed recordings contain the primary and secondary waves selected at the bedside, or, for telemetry, on the Patient Window. Delayed recordings always print on the 2-Channel Recorder (M1116B or M3176C).

Note—

- For EASI CMS and V24 bedsides, if your system is configured for second ECG the secondary wave will always be the second channel of ECG regardless of the secondary wave selected at the CMS or V24 bedside.
- For M3 bedside monitors, waves for delayed recordings are not selectable. The pre-set waves for recording are: ECG CH-1 and Invasive Pressure-1. If Invasive Pressure-1 is not available, the following waves are substituted (by the following pre-set priority): Invasive Pressure-2, CO2, ECG CH-2, ECG CH-3, Pleth, Resp.
- For IntelliVue Patient Monitors, the waves that are recorded are those that are configured for recording at the IntelliVue Patient Monitor. For IntelliVue Patient Monitors, when selecting waves for recording only select waves that are available to you at the Information Center and are visually present in the patient window. If you select waves that are not available at the Information Center, the Information Center will substitute the primary ECG and the highest priority bedside wave on the recording. See your IntelliVue Patient Monitor user documentation for details.

Delayed recordings can be initiated from the Information Center, or from the bedside. For telemetry patients, a Nurse Call recording can be initiated when the Telemetry Button on the telemetry device is pressed (if configured and turned on).

Making a Delayed Recording

The length of the recording and the waves are pre-set for your unit. Factory defaults are 10 seconds pre-event and 2 seconds post-event. In the example below the arrow indicates when the recording was requested.

10 seconds PRE-EVENT + 2 seconds POST-EVENT = 12 seconds TOTAL RECORDING



Note—The actual length of a delayed recording may be longer than the pre-set length to allow for all of the annotations to be printed. In timed recordings, since the number of seconds of pre-event and post-event wave(s) are pre-set for your unit, if the event is longer than this amount of time, you will not capture the entire event. Use Wave Review to see the entire event. See “Wave Review” on page 6-30.

Task Summary

When you request a delayed recording the Philips Information Center begins recording the waves for the sector(s) you selected and stops automatically.

If your system is set up to produce a delayed recording, the label on the button in the patient sector that appears when the cursor is in the sector or the sector is selected using a touch screen display will be **Record** or **Record and Save**. You request a delayed recording by selecting the button.

Action of Patient Sector Button

Depending on how your system is configured, selecting a button in the patient sector initiates a delayed recording or the saving of a strip. The action of the button is shown by the button label.

The labels are:

- **Record** -- this generates a paper recording of the primary and secondary waves.
- **Save** -- this generates a 30-second strip saved in Alarm Review and Event Review.
- **Record and Save** -- this generates both a paper recording and a strip in Alarm Review and Event Review.

Note—Strips can be viewed in Alarm Review if “ALL ALARMS” or “USER- SAVED STRIPS” is selected. Strips can be viewed in Event Review if “USER- SAVED STRIPS” is displayed.

The number of user-saved strips is limited (10 if your Alarm Review has a 50-record capacity, or 30 if your Alarm Review has a 150-record capacity). If the maximum number of strips is reached, when a new strip is saved, the oldest saved strip is automatically deleted.

Making an Alarm/ Delayed Recording Continuous

You can make an alarm or delayed recording continuous while the recording is printing by pressing the **RUN/CONT** key on the recorder module. To terminate a recording, press the **STOP** key on the recorder module.

If the recording was queued (e.g., because the recorder was busy or out of paper), it cannot be made continuous.

Extending a Delayed Recording at the M3 Monitor

You can extend a delayed recording requested from the bedside by pressing the **Delayed Recording** button on the M3 monitor. This causes the recording to run, then be extended by a pre-set number of seconds. That is, if the recording is pre-set to run for 12 seconds, the recording will be extended an additional 12 seconds. The recording will be extended for each time the button is pressed.

If the recording was queued (for example, because the recorder was busy or out of paper), it cannot be extended.

**Making a
Delayed
Recording
for All Beds**

Regardless of whether or not your system is set up to allow delayed recordings initiated from the patient sector, you can make a delayed recording for all beds that are displayed. You request a delayed recording for all sectors by performing the following steps:

Step	Action
1	Get to the All Controls Window for any sector.
2	Select the Record All button in the title bar. The Information Center will initiate a delayed recording for all sectors that currently have patient data. <i>Note</i> —Sectors without beds or equipment assigned will not have a recording printed.

Saving a Strip from the Patient Sector

Overview

Your system can be configured to allow you to select a button in the patient sector to quickly capture 30 seconds of waveforms that are saved in the database. You can view these saved strips in either Alarm Review or Event Review. The strip contains 10 seconds of wave before the button was selected, and 20 seconds after.

**Task
Summary**

If your system is set up to allow saving of strips, the label on the button in the patient sector that appears when the cursor is in the sector will be **Save** or **Record and Save**. To save a strip, select the button.

**Selecting the
Waves that are
Saved**

The waves that are saved can be selected on a per patient basis in the Stored Waves Window, Alarm Waves tab. See “Changing the Waves that are Stored” on page 6-53.

Making Real-Time Recordings

Overview

A real-time recording is a continuous recording that shows waves that occur after you request the recording. You select the waves to record and have to manually stop real-time recordings.

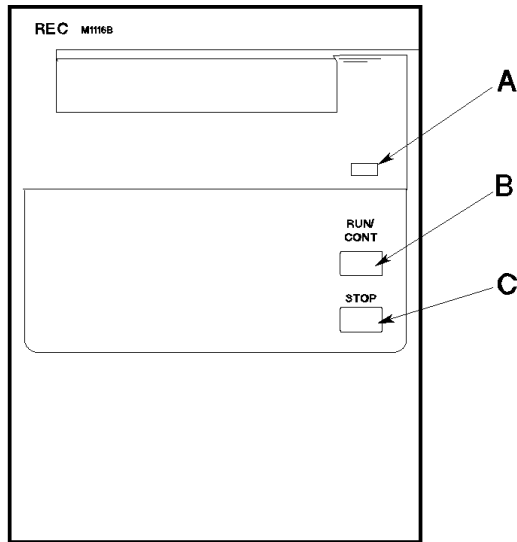
Task Summary

Make a real-time recording by performing the following steps:

Step	Action
1	In the Patient Window select the Continuous Recording button. The Philips Information Center displays a pop-up box.
2	If a 4-channel recorder is available in your unit, specify whether this recording is going to the 2-channel or 4-channel recorder by selecting on the appropriate radio button in the Recorder Type field. Selecting the 4 Channel button directs the recording to the 4-channel recorder. Selecting the 2 Channel button directs the recording to the 2-channel recorder.
3	Select the waves to record by selecting the waves from the Wave Settings drop-down list. <i>Note</i> —You can make wave one an arrhythmia wave by selecting on the Beat Labels box. <i>Note</i> —If you select waves for recording that are not available to you at the Information Center the Information Center substitutes the primary ECG and the secondary wave on the recording.

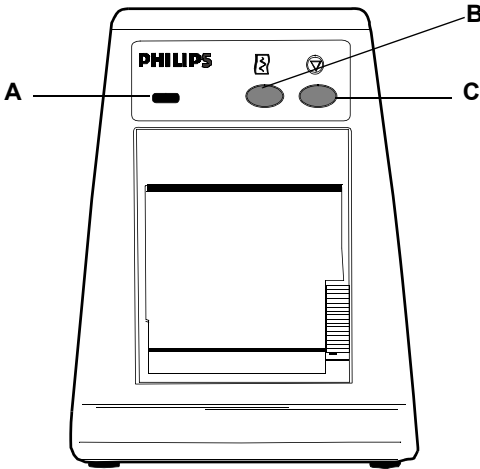
Step	Action
4	<p>Specify whether to overlap the waves or not by selecting the Overlap box.</p> <p>With the 2-channel recorder:</p> <ul style="list-style-type: none"> • No overlap -- no waves overlapped. The size of the grid is 40 mm for one wave, 20 mm for two waves. • Overlap -- overlap two waves in one 40 mm sector. <p>With the 4-channel recorder:</p> <ul style="list-style-type: none"> • No overlap -- no waves overlapped. The size of each grid is 100/(number waves selected). • Overlap -- produces a recording of Wave 1 (50 mm) above Wave 2-4 (50 mm).
5	<p>Select the Record button. The recording begins and continues until you select the Stop button in the Continuous Recording box or press Stop on the recorder module.</p>

Controls and Indicators on the Philips M1116B 2-Channel Recorder Module



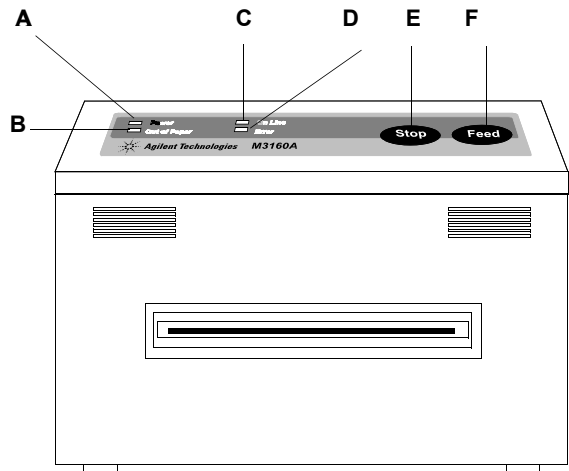
A. Continuous light	Lights if the currently printing recording is continuous.
B. RUN/CONT (continue) key	Makes a currently printing recording continuous (if possible).
C. STOP key	Stops the currently printing recording.

Controls and Indicators on the Philips M3176C 2-Channel Recorder



A. Continuous light	Solid - Ready
	Blinking - Continuous recording printing or recorder reset
	Off - Error state or powered off
B. RUN/CONT (continue) key	Makes a currently printing recording continuous (if possible).
C. STOP key	Stops the currently printing recording.

Controls and Indicators on the M3160A 4-Channel Recorder



A. Power	Light illuminates when power is on.
B. Out of Paper	Illuminates when the paper has not been properly set or when there is no paper.
C. On Line	Illuminates when the recorder is ready to accept data. The light flickers on and off during normal operation.
D. Error	Illuminates to indicate that an error occurred during data transmission or there is a problem with the recorder.
E. Stop	Press this button to stop the currently printing recording.
F. Feed	Pressing this button causes the printer to eject paper for as long as the button is depressed.

Recording Priority

If all recorder modules are busy or inoperable, recording requests are queued (stacked). Recordings then print when a recorder module becomes available. The table below provides the priority (from highest to lowest) and the number of requests per patient that can be in the queue.

Recording Requested	Priority
Real-time	One request per patient is queued. If other recordings are printing when you request a real-time recording the Philips Information Center processes the request as follows: <ul style="list-style-type: none">• If a real-time recording is running, a new real-time request for a different patient is queued. If the new request is for the same patient, the new request is not accepted.• If a timed recording is running, the real-time request is queued. When the current recording finishes printing, the real-time recording starts. The waves will be from the time the recording starts printing, and not from the time of the request.
Alarm	Five alarms per patient are queued. New alarm requests replace the oldest request. If alarms are older than 1 hour, only 1 alarm is queued.
Delayed	One request per patient is queued. New delayed requests for the patient replace the pending request.
Procedure	Ten strips per patient are queued.

If there is no recorder available for 12 hours due to a recorder failure, the recorder door being left open, or the recorder out of paper, then all recordings in the queue are deleted. In addition, all recordings in the queue are deleted if monitoring mode is exited (for example, if the system is rebooted).

Recording Status Messages

Main Screen Messages

The messages in the table below appear in the status message line at the top of the Main Screen.

Note—The “X” indicates the position of the 2-channel recorder module in the rack, for example, Left, Center, Right.

Message	Meaning
X recorder out of paper	No recording can be made on this recorder module until you replace the paper.
X recorder door is open	No recording can be made on this recorder module until you close the recorder module door.
No recorder connected	No recorder module is plugged into the recorder rack. Check connections.
X recorder hardware fault	The recorder module is inoperable. Contact service.
Recorder Rack or Power Supply Fault or No Recorder	There is a fault in the recorder rack or the rack power supply. Contact service if the message persists.
4 Channel Recorder Not Ready	Indicates that either the 4-channel recorder is out of paper, has no power, the serial recorder cable is not connected or the recorder had some internal failure causing it to be offline. <i>Note</i> —There is a LED on the front of the recorder that illuminates when there is no paper in the recorder.

The device name is also indicated in the message (for example “CCU1 Left recorder door is open”).

**Recorder
Messages at
the M3
Monitor**

The messages in the table below appear at the M3 monitor when recordings are generated.

Recording Type	Message	Meaning
Alarm	No Alarm Recording Available	No recorders configured on the Information Center are functioning; no recorders are configured on the Information Center.
Delayed	Delayed Recording Accepted	Delayed recording request successfully received at the Information Center.
	Delayed Recording Running	Delayed recording request is active.
	Delayed Recording Extended	Delayed recording successfully extended.
Delayed	Recording Stopped	Delayed recording stopped.
Continuous	Continuous Recording Running	Continuous (Realtime) recording request is active.
	Recording Stopped	Realtime recording was manually stopped.

Annotation

The recording annotation for delayed, real-time, and alarm recordings includes the following information:

- Patient name (as entered in the Admit Window)
Note—For SDN bedsides connected to the M3170 Patient Link Information Center patient name is not included on the recording annotation.
- Patient Medical Record number (as entered in the Admit Window)
- Bed label
- Date and time (time of the first wave data on the recording)
- Current alarm text (for alarm recordings only)
- If the alarms are suspended/paused, the text “Alarms Suspended” or “Alarms Paused”
Note—When a bedside monitor is paired with a telemetry device and the bedside alarms are suspended/paused the text “Alarms Suspended” or “Alarms Paused” is not included in the recording annotation. When a bedside monitor is paired with a telemetry device and the telemetry alarms are suspended the annotation on the recording strip is “Alarms Suspended”. See “Pairing/Unpairing Telemetry Equipment” on page 2-31 for more information on the pairing of telemetry devices and bedsides monitors.
- INOP text (if available)
- Patient parameters (associated with the date and time of the recording -- subset for alarm recordings)
- Rhythm (if available)
- Recorder speed
- Bandwidth (for ECG waves suitable for ST measurements)
- For ST/AR alarm recordings, the 7-character encoded ST/AR configuration parameters. See Appendix C, “ST/AR Configuration Reporting” for description of the encoded ST/AR configuration parameters.

Annotation

The recording annotation for recordings made from Alarm Review (for both alarm strips and saved strips) includes the following information:

- Patient name (as entered in the Admit Window)
- Patient Medical Record number (as entered in the Admit Window)
- Bed label
- Date and time (time of the first wave data on the recording)
- Alarm text specific to the alarm (for alarm strips only)
- Recorder speed

Note—Procedure recordings generate their own annotation.

Timed, delayed recordings continue until all of the annotation is complete.

Re-Annotation

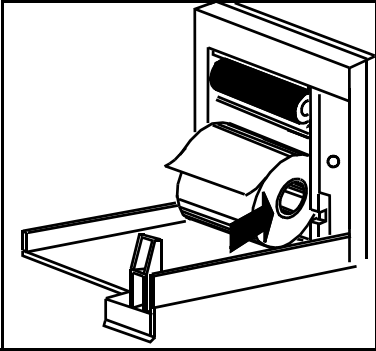
Real-time and delayed recordings that are continued are re-annotated every 50 mm with a subset of the annotation information.

Loading Paper into the M1116B 2-Channel Recorder

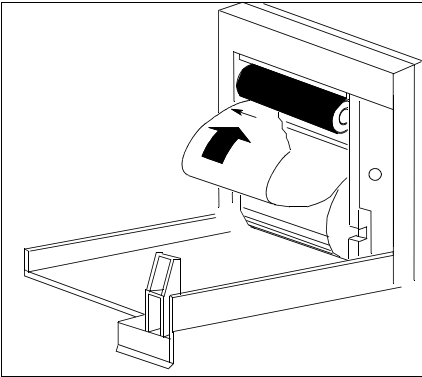
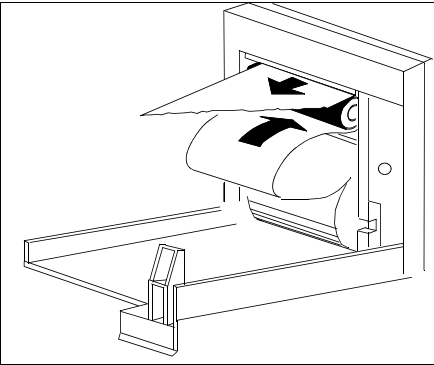
A message appears at the top of the screen when the recorder is out of paper.

Task Summary

To load paper into the recorder perform the following steps:

Step	Action
1	<div>Insert a new roll with paper feeding from the top. Hold paper lead then push on the roll until it clicks into place.</div> <div></div>
2	<div>Tear paper at a 45 degree angle.</div>

Loading Paper into the M1116B 2-Channel Recorder

Step	Action
3	Feed paper under roller, using left edge of paper as a guide. <div></div>
4	Pull paper out and close door. <div></div>

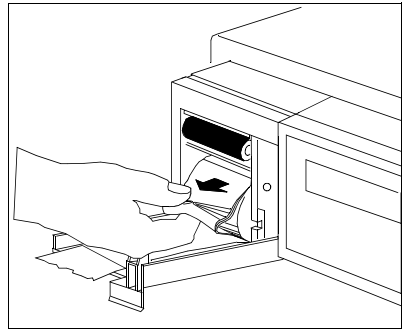
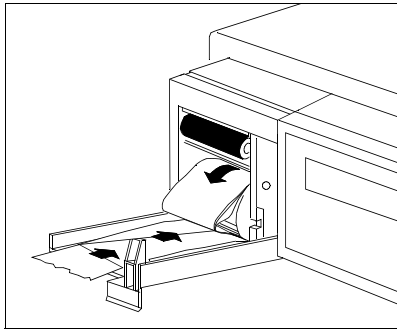
Testing

You can test to see if the recorder paper is loaded correctly by selecting the **Record** button in any Patient Sector that has waves. If no printing appears on the strip, the paper is loaded backwards. Remove the roll and reload.

**Task
Summary**

To remove roll:

Step	Action
1	Tear off the paper.
2	Open the recorder door.
3	Pinch the paper at the shelf below the roller, and pull the paper off the roller.
4	Gently push the excess paper back onto the paper roll to loosen.
5	With the paper rolled loosely, pinch several thicknesses and pull roll out.



Loading Paper into the M3176C 2-Channel Recorder

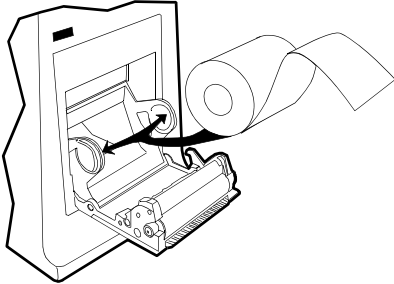
Overview

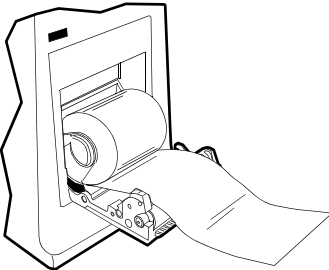
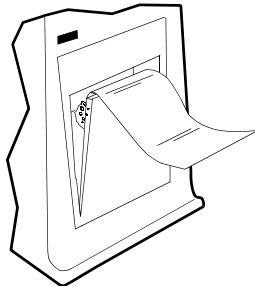
A message appears at the top of the screen when the recorder is out of paper. The M3176C USB 2-channel recorder requires M4816/17A paper to operate properly.

Note—The only paper that can be used with the M3176C USB 2-channel recorder is M4816/17A. If the wrong paper installed, no recordings are printed on the paper.

Task Summary

To load paper into the recorder perform the following steps:

Step	Action
1	<div>Insert a new roll with paper feeding from the bottom. </div>

Step	Action
2	Pull the paper so it extends beyond the edge of the door. 
3	Close door. 

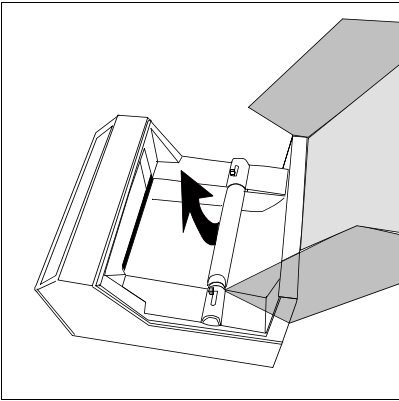
Testing

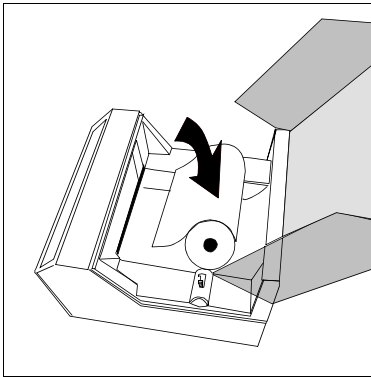
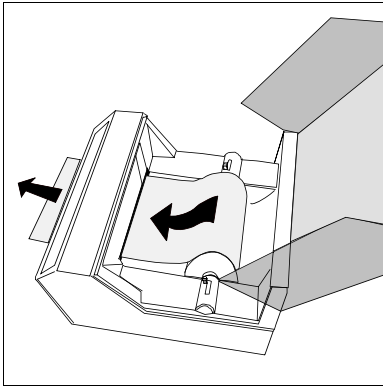
You can test to see if the recorder paper is loaded correctly by selecting the **Record** button in any Patient Sector that has waves. If no printing appears on the strip, the paper is loaded backwards. Remove the roll and reload.

Important—When removing a printed recording from the M3176C USB 2-channel recorder be sure to tear the paper in an upward or downward motion. Tearing the paper aggressively by pulling the recorder paper forward or at an angle can cause the recorder out of paper sensor to trigger causing the LED to flash and an out of paper message to display on the Information Center.

Loading Paper into the 4-Channel Recorder

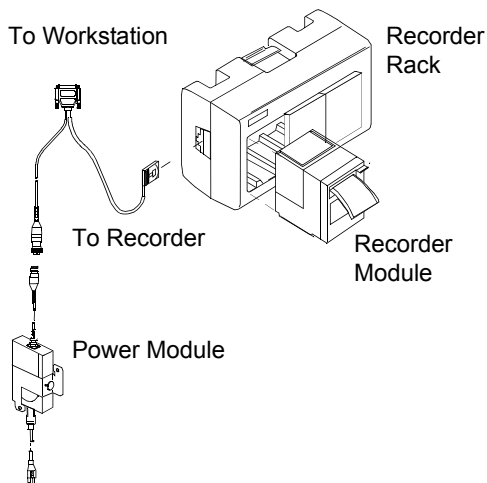
To load paper into the 4-channel recorder perform the following steps:

Step	Action
1	Lift the clear plastic cover on the top of the recorder.
2	Remove the old spool from the recorder by pushing up and out on the two plastic tabs that hold the spool in place. <div></div>

Step	Action
3	<p>Place the new spool in the recorder by pushing down and in on the two plastic tabs. Be sure that the paper feeds from the top of the roll.</p> 
4	<p>Trim the end of the paper to make a clean edge.</p>
5	<p>Insert the paper near the feed slot. The recorder automatically takes up the paper.</p> 
6	<p>Close the plastic cover on the top of the recorder.</p>

Philips M1116B 2-Channel Recorder Connections

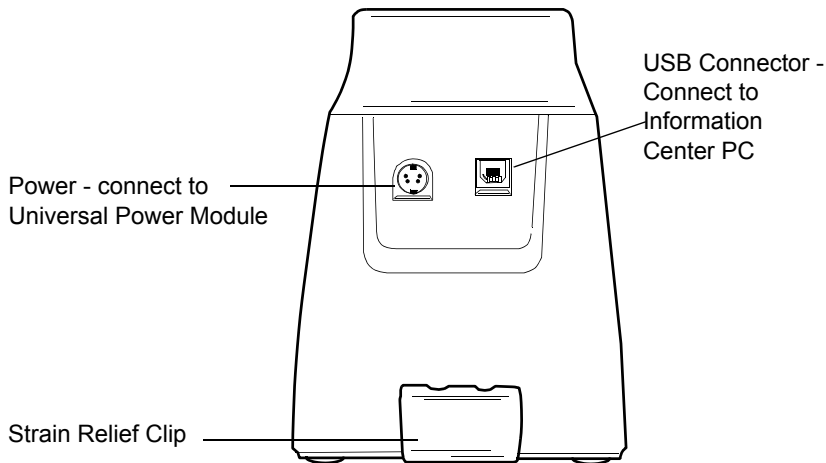
The following diagram displays the M116B 2-channel recorder connections.



Note—To remove a recorder module press on the two tabs on the bottom of the module and pull the module out.

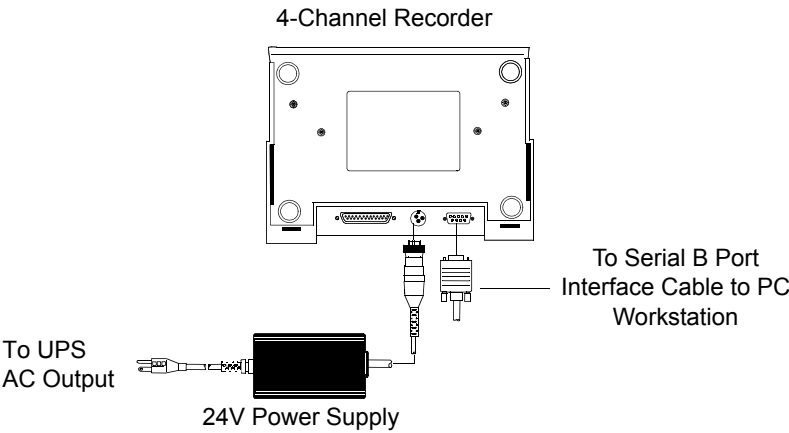
Philips M3176C 2-Channel Recorder Connections

The following diagram displays the M3176C 2-channel recorder connections. If more than one recorder is to be connected together, use the appropriate 2 or 3 connector cable to connect all three recorders to the Universal Power Module.



M3160A 4-Channel Recorder Connections

The following diagram displays the 4-channel recorder connections.



Ordering Information for Supplies for Recorders

Paper

Paper for the M1116B 2-Channel Recorder Module

Part Number 40477A Recorder paper -- 20 rolls

Part Number 40477B Recorder paper -- 80 rolls

Paper for the 4-Channel Recorder

Part Number PSE 11268 Recorder paper -- 24 rolls

Paper for the M3176C 2-Channel Recorder Module

Part Number M4816/17A Recorder paper

Cleaning Kit

Cleaning Kit for M1116B 2-Channel Recorder Module

Part Number M1116-80201 Cleaning Kit for Printhead

Printing Reports

If a Information Center printer is connected, you can initiate reports from the Philips Information Center or from a bedside monitor, with the exception of the wireless M3 or the Compact Configurable Monitor.

Note—Reports requested from a wired/wireless M3 bedside monitor can be printed via the IR link on a printer located at the bedside.

See Chapter 6, “Patient Data Review” for a description of the reports that you can initiate from the Philips Information Center. For operating information on printers, please see the documentation that was shipped with your printer.

**Printer
Status
Message**

The message “Printer needs attention” appears in the status message line at the top of the Main Screen when any of the following occur:

- Printer is out of paper
- Printer has a paper jam
- Printer memory is full
- Printer is not turned on
- Printer cable is not connected
- Printer has a software or hardware failure
- Connectivity to a LAN-connected printer has failed
- NT print spool is full

In all cases you should check the status display on the printer and fix the problem or notify service.

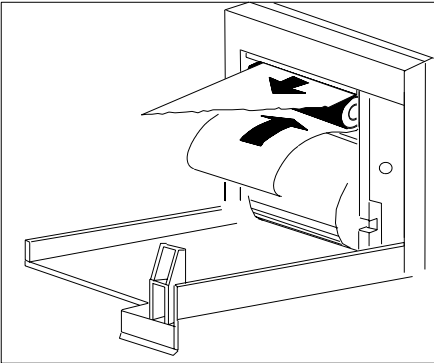
**Printer
Messages at
the M3
Monitor**

The messages in the table below appear at the M3 monitor when a report is requested at the bedside.

Message	Meaning
Printing	The report request was successfully received at the Information Center.
Printer Not Available	The configured printer is not currently available due to a network failure or printer failure.

Cleaning the Philips M1116B 2-Channel Recorder Printhead

If you run recordings at low speed (1 or 2cm/min) for extended periods, deposits of paper debris may collect on the print head making recordings unevenly fainter in horizontal stripes.

Step	Action
1	Remove the recorder.
2	Open the recorder door and un-thread the paper from behind the rubber roller.
3	Tear off or roll up the excess paper into the roll chamber to get it out of your way.
4	Thread the cloth cleaning strip instead of paper around the rubber roller until approximately two inches of the leader come out from the top of the roller. <div></div>
5	Close the recorder door, aligning both ends of the strip over the top of the door.

Cleaning the Philips M1116B 2-Channel Recorder Printhead

Step	Action
6	Holding the top end of the cleaning strip between your thumb and forefinger. Pull the strip through and out of the recorder.
7	Open the door and ensure that the paper cavity is dust-free. Re-thread the paper and replace the recorder.

Alarm Management and Setup

This chapter describes the alarms detected by the Information Center. It includes the following sections:

- Overview 4-2
- Alarm Indicators 4-3
- Alarm Levels and Priorities 4-4
- Active Alarm Sound 4-6
- Alarm Messages 4-7
- Alarm Adjustments 4-13
- Timeout Periods 4-25
- Alarm Chaining 4-26
- Silencing Alarms 4-30
- Suspending/Pausing Alarms 4-34
- Telemetry Smart Limits 4-35
- Adjusting the Alarm Tone Volume 4-38
- Recording/Storing Alarms 4-39

Overview

The Information Center annunciates all alarm conditions that it detects as well as those detected by bedside monitors. Control of alarm limits and alarm on/off status depends on the device where the alarm event is detected.

The Information Center *detects* the following alarms:

- Arrhythmia alarms for both bedside monitors (other than M3 monitors) and telemetry.
- ST segment alarms for telemetry.

The Information Center detects arrhythmia alarm conditions by comparing ECG data against a set of pre-defined rules/criteria for the condition. An alarm condition can be in the form of a rate exceeding a threshold (for example, HR >xx), an abnormal rhythm (for example, Ventricular Bigeminy), or an ectopic event (for example, Pair PVCs).

You can adjust the thresholds for arrhythmia alarm conditions through the Arrhythmia Alarms Window (for monitoring devices other than M3 monitors). See “Adjusting Alarms” on page 4-13 for information on adjustments available in the Arrhythmia Alarms Window. You can adjust the thresholds for ST alarms through the ST Alarms Window. See your telemetry system *Instructions for Use*.

Note—Except for telemetry EASI ECG, arrhythmia analysis can be set to off either for an individual patient or for all patients (under unit settings). In this case, no arrhythmia alarms are generated by the Information Center. (Asystole and V-Fib alarms from the bedside/telemetry cardiotach are active.) See “Arrhythmia Analysis Off” on page 4-23 for more information. Also, no arrhythmia alarms are generated if alarms are suspended/paused, if ECG alarms are turned off, or if the HR alarm source is set to Pulse.

M3 Monitors

If the patient is monitored by a M3 monitor, arrhythmia monitoring is done at the bedside monitor. All alarms (including arrhythmia alarms) are announced at the Information Center; all alarm settings are controlled at the monitor. See the *M3 Instructions for Use* for information.

IntelliVue Patient Monitors

If the patient is monitored by a IntelliVue Patient Monitor, arrhythmia monitoring is provided by the bedside monitor. All alarms (including arrhythmia alarms) are announced at the Information Center. Controls for arrhythmia analysis and alarm limits are adjustable and viewable at both the Information Center and the IntelliVue Patient Monitor. See your IntelliVue Patient Monitor user documentation for information on arrhythmia monitoring and the IntelliVue Patient Monitors.

Alarm Indicators

The Information Center indicates alarm conditions by using the following signals:

- The patient sector turns blue (except for soft INOPs/technical alarms, see page 4-6).
- An alarm message displays in the patient sector and in the Patient Window.
 - For rate alarm conditions, the message indicates what parameter is in alarm, the maximum or minimum value, and the alarm limit that was violated (for example, HR 134>120)
 - For event alarm conditions, the message indicates the event that caused the alarm (for example, Asystole).
- An alarm tone sounds that is indicative of the alarm type (except for soft INOPs/technical alarms, see page 4-6).

Note—There is no sound for soft INOPs/technical alarms.

All active alarms for bedside monitors are annunciated at both the bedside and at the Information Center. All alarms for telemetry-monitored beds are only annunciated at the Information Center.

Alarm Levels and Priorities

There are three different levels of alarm conditions:

- Red
- Yellow
- INOP (technical alarm).

The Information Center indicates the level of the alarm by:

- The alarm sound.
Note—Depending on how your system is setup the alarm sounds can be configured for either Traditional/CareNET or IEC/ISO standard alarm sounds. See the table below.
- Number of asterisks (*) in the alarm message.
- The color of the message.

The table below lists the levels of alarms in order of their priority.

Alarm Level	Sound	Message	Meaning
Red (***)	<i>Traditional/ CareNet Sound:</i> Continuous high-pitch rapid tone <i>IEC/ISO Sound:</i> Repeated bursts of five rapid high-pitch beeps	*** next to the alarm message	Life threatening, for example, ASYSTOLE

Alarm Level	Sound	Message	Meaning
Yellow (**) (long yellow)	<i>Traditional/</i> <i>CareNet Sound:</i> Continuous medium- pitch tone <i>IEC/ISO Sound:</i> Repeated bursts of three rapid low- pitch beeps	** next to the alarm message	Non-arrhythmia alarm limit violation. <i>Note</i> —This does not apply to HR, which is an arrhythmia alarm
Yellow (*) Arrhythmia (short yellow)	<i>Traditional/</i> <i>CareNet Sound:</i> Noncontinuous medium-pitch tone sound (for several seconds) <i>IEC/ISO Sound:</i> Two rapid low- pitch beeps	* next to the alarm message	Arrhythmia yellow alarm detected
Yellow (**) Nurse Call (Telemetry) (short yellow)	<i>Traditional/</i> <i>CareNet Sound:</i> Noncontinuous medium-pitch tone sound (for several seconds) <i>IEC/ISO Sound:</i> Two rapid low- pitch beeps	** next to the alarm message	The telemetry button on the telemetry device has been pressed (and the system is configured to alarm and the telemetry button is on).
Hard INOP/ Technical Alarm (inoperative condition)	<i>Traditional/</i> <i>CareNet Sound:</i> Continuous slow low-pitch tone <i>IEC/ISO Sound:</i> Repeated bursts of two slow low- pitch beeps	no asterisks appear next to the message	Inoperative condition that prevents monitoring, for example, LEADS OFF or which has a direct effect on the patient, for example, NBP CUFF OVERPRESS.

Alarm Level	Sound	Message	Meaning
Soft INOP/ Technical Alarm (inoperative condition)	none	no asterisks appear next to the message	Inoperative condition which prevents the system from processing signals properly, for example, NOISY ECG. Monitoring usually continues during this condition.

Active Alarm Sound

There can be only **one** alarm sound annunciating at the Information Center at one time.

- If there is an unacknowledged red level alarm in the presence of any other level alarm the sound for the red alarm will annunciate.
- If there is no unacknowledged red level alarm condition and there is an unacknowledged long yellow alarm in the presence of any other yellow or INOP/technical alarm (acknowledged or unacknowledged) the sound for the long yellow will annunciate.
- If there is no unacknowledged red level alarm or long yellow level alarm condition and there is an arrhythmia or nurse call event, the short yellow (*) alarm sound will annunciate.
- If there are no unacknowledged red or long/short yellow alarm conditions and there is any bed with an unacknowledged hard INOP/technical alarm condition the sound for the hard INOP/technical alarm annunciates.

Alarm Messages

There are two alarm condition message areas in the patient sector and the Patient Window: one area for red and yellow level alarm messages, and the other for INOPs/technical alarms. If you place the cursor over the alarm condition message, a pull-down list displays the message with the time of the alarm or INOP/technical alarm condition.

If there is more than one alarm or INOP/technical alarm condition present, there will be an arrow to the right of the message. In this case, placing the cursor over the alarm or INOP/technical alarm condition message displays a pull-down list with up to 10 active alarm condition messages (with times indicated), the oldest alarm condition appearing first. If there are 10 alarm conditions and a new alarm condition occurs, the oldest alarm condition is removed from the list and the new alarm condition is added to the bottom of the list.

Note—For IntelliVue Patient Monitors, the highest priority alarm is always shown in the alarm conditions message area. Up to 10 current alarms conditions are shown in the pull-down list. If more than 10 alarms are active, then some will not be shown in the list. A review of all active bedside alarms is available at the bedside. See your bedside documentation.

If there are concurrent red and yellow alarm conditions, the red alarm condition message displays first, and the yellow alarm condition message(s) are available in the pull-down list.

- Cardiac alarms have the highest priority.
- If there is a red alarm condition, and a new red alarm occurs, the new alarm message replaces the old.
- If there is a yellow alarm condition, and a new yellow alarm condition occurs, the new alarm condition message replaces the old.
- If there is an INOP/technical alarm condition, and a new INOP/technical alarm condition occurs, the new INOP/technical alarm condition message replaces the old.

- If there is a yellow arrhythmia alarm condition, the message displays for 3 minutes unless silenced regardless of whether the alarm condition persists or not. If silenced and the alarm condition is no longer active, the message goes away immediately. If the alarm condition is still active the message remains until the alarm condition clears, whether silenced or not. See page 4-30 for information on yellow alarm behavior and silencing alarms.

Warning

If alarm annunciation is silenced and alarm reminders are configured off, the alarm condition message will persist but there will be no audible alarm annunciation.

The table on the following page lists the arrhythmia alarm condition messages. For a list of ST alarm condition messages (for telemetry monitored patients) see the *Philips Telemetry System Instructions for Use* and the *IntelliVue Telemetry System Instructions for Use*.

Arrhythmia Alarm Messages

The following table lists the Arrhythmia alarm conditions and the description of the criteria required to generate these alarms. In the table below, yyy = patient’s rate and xxx = limit that was exceeded. The messages that display depend on whether you have basic or enhanced arrhythmia. See “Levels of Arrhythmia Analysis” on page 5-3.

Red-level alarm conditions are announced by continuous chiming. Yellow-level alarm conditions are announced by a tone that sounds for several seconds (to distinguish them from non-arrhythmia alarm conditions that have a continuous tone.)

Message	Level	Description
*** ASYSTOLE	Red	No QRS detected for x seconds. Choices of > 2.5 to 4 seconds ^a Note: M3/M4 - No QRS detected for 4 consecutive seconds
*** V-FIB/TACH	Red	Fibrillatory wave (sinusoidal wave between 2-10 Hz) for 4 consecutive seconds

Message	Level	Description
*** V-TACH	Red	Consecutive PVCs \geq V-Tach Run limit <u>and</u> HR $>$ V-Tach HR limit
*** TACHY yyy $>$ xxx	Red	Heart Rate (yyy) greater than the Extreme Tachy limit (xxx)
*** BRADY yyy $<$ xxx	Red	Heart Rate (yyy) less than the Extreme Brady limit (xxx)
* NON-SUSTAIN VT	Yellow	A run of Vs having a ventricular HR $>$ V-Tach HR limit, but lasting for less than the V-Tach Run limit
* VENT RHYTHM	Yellow	A dominant rhythm of adjacent Vs $>$ vent rhythm limit and ventricular HR $<$ V-Tach HR limit
* RUN PVCs	Yellow	Run of PVCs greater than 2
* PAIR PVCs	Yellow	Two consecutive PVCs between non-PVCs
* PAUSE	Yellow	No QRS detected for x seconds. Choices of >1.5 to 2.5 seconds. ^a <i>Note</i> —M3/M4- No beat detected for 1.75 x average R-R interval for HR <120 , or no beat for 1 second with HR >120 (non-paced patient only)
* PACER NOT CAPT	Yellow	No QRS for 1.75 x the average R-R interval with Pace Pulse (paced patient only)
* PACER NOT PACE	Yellow	No QRS and Pace Pulse for 1.75 x the average R-R interval (paced patient only)
* MISSED BEAT	Yellow	No beat detected for 1.75 x average R-R interval for HR <120 , or no beat for 1 second with HR >120 (non-paced patient only) <i>Note:</i> M3/M4-this alarm is not available

Alarm Messages

Message	Level	Description
* SVT	Yellow	Run of SVPBs \geq SVT Run limit and with SVT Heart Rate greater than the SVT HR limit
* R-ON-T PVCs	Yellow	For HR < 100 , a PVC with R-R interval $< 1/3$ the average interval followed by a compensatory pause of $1.25 \times$ average R-R interval or 2 such Vs without a compensatory pause occurring within 5 minutes of each other. (When HR > 100 , $1/3$ R-R interval is too short for detection.)
* VENT BIGEMINY	Yellow	A dominant rhythm of N, V, N, V (N=supraventricular beat, V=ventricular beat)
* VENT TRIGEMINY	Yellow	A dominant rhythm of N, N, V, N, N, V (N=supraventricular beat, V=ventricular beat)
* PVCs $> xxx$ /MIN	Yellow	PVCs within one minute exceeded the PVCs /min limit (xxx)
* MULTIFORM PVCs	Yellow	The occurrence of two differently shaped Vs, each occurring at least twice within the last 300 beats as well as each occurring at least once within the last 60 beats
* HR yyy $> xxx$	Yellow	Heart Rate (yyy) greater than the upper HR limit (xxx)
* HR yyy $< xxx$	Yellow	Heart Rate (yyy) lower than the lower HR limit (xxx)
* IRREGULAR HR	Yellow	Consistently irregular rhythm (irregular R-R intervals)

- a. With a pause/asystole event lasting > 2.5 secs and when the time interval for Asystole is set to 2.5 secs and when the Pause interval is set to 2.5 secs, the system will annunciate for asystole.

Arrhythmia INOP/ Technical Alarm Messages

The following table lists the Arrhythmia INOP/Technical Alarm messages and the description of the criteria required to generate these alarms, along with the action to take.

Message	Level	Description	Action to Take
ALL ARRHR ALRMS OFF	Soft INOP/ Technical Alarm (no sound)	All of the arrhythmia alarms are turned off because one of the following: a. Alarms are suspended/paused. b. HR alarm is turned off at the bedside c. HR alarm source at the bedside is switched to Pulse d. “All Arrhythmia Alarms Off” in the Arrhythmia Alarms Window is checked for a telemetry bed	Depending on the cause: a. Unsuspend/resume alarms b. Turn HR alarm on at bedside c. Switch HR/Pulse alarm source to HR at bedside d. Select “All Arrhythmia Alarms Off” to remove the check in the Arrhythmia Alarms Window of telemetry bed
CANNOT ANALYZE ECG	Hard INOP/ Technical Alarm (can be changed to Soft INOP/ Technical Alarm on a per patient basis)	The Arrhythmia algorithm cannot reliably analyze the ECG data on any monitored leads. Note —If a LEADS OFF condition exists, the LEADS OFF message has a higher priority than CANNOT ANALYZE ECG and will be displayed first in the INOP/Technical Alarm message area. You can view all current INOP/Technical Alarm messages in the pulldown list.	Improve lead position; reduce patient motion If EASI ECG from a bedside monitor, check that the ECG module is M1001B or M1002B.

Alarm Messages

Message	Level	Description	Action to Take
ARRHYTHMIA OFF (not displayed at the bedside)	Soft INOP/ Technical Alarm (no sound)	Arrhythmia analysis (and ST, if telemetry) is turned off -- the bedside/telemetry cardiograph is used.	You can turn arrhythmia analysis back on in the Arrhythmia Alarms Window -- Analysis control.
SOME ECG ALARMS OFF (can be configured to be disabled in Unit Settings)	Soft INOP/ Technical Alarm (no sound)	One or more ** level Arrhythmia alarms have been manually turned off	Use the Arrhythmia Alarms Window to review current status of all alarms
ARRHY REQUIRED (telemetry only)	Hard INOP/ Technical Alarm	An EASI telemetry device is being used, and arrhythmia analysis has been turned off at the Information Center.	Turn arrhythmia analysis on in the Arrhythmia Alarms Window -- Analysis control

Alarm Adjustments

Overview

All alarm conditions generated by the Information Center come with unit default settings (limits and on/off status) that are configured for a unit (see Chapter 9, “Information Center Configuration”). In addition, you can make adjustments to alarm settings to accommodate the clinical condition of the individual patient.

Note—Alarm conditions generated at a bedside monitor are controlled only at that monitor. For M3 monitors, all alarm settings (including arrhythmia) are controlled at the bedside monitor.

Adjusting Alarms

The adjustments to alarm settings that you can make from the Information Center depend on the point-of-care equipment being used. The table on the next page summarizes the arrhythmia and ST alarm controls.

Note—Information Center alarm adjustments are not available for bedsides connected to the M3170 Patient Link Information Center.

Feature	M3 bedside monitors	IntelliVue Patient Monitors	Other bedside monitors	Telemetry	Telemetry with EASI telemetry devices
Arrhythmia Monitoring	<ul style="list-style-type: none">• Provided by bedside monitor• Single-lead or Arrhythmia Off• Basic or enhanced capability, depending on model and configuration	<ul style="list-style-type: none">• Provided by the bedside monitor• Multilead, Single-lead, or Arrhythmia Off• Basic or enhanced capability	<ul style="list-style-type: none">• Provided by Information Center• Multilead, Single-lead, or Arrhythmia Off• Basic or enhanced capability	<ul style="list-style-type: none">• Provided by Information Center• Multilead, Single-lead, or Arrhythmia/ST Off• Basic or enhanced capability	<ul style="list-style-type: none">• Provided by Information Center• Multilead or Single-lead (cannot be turned off for EASI ECG)• Basic or enhanced capability

Alarm Adjustments

Feature	M3 bedside monitors	IntelliVue Patient Monitors	Other bedside monitors	Telemetry	Telemetry with EASI telemetry devices
Arrhythmia Controls	<ul style="list-style-type: none"> • At bedside only • Relearn available at Information Center Arrhythmia Analysis Window 	<ul style="list-style-type: none"> • At bedside or Information Center <p>However, the following controls are not available for an IntelliVue Patient Monitor:</p> <ul style="list-style-type: none"> • Unit settings • Sound at bedside for ECG yellow alarms • Cannot analyze ECG (sound) <p><i>Note</i>—You must enable remote controls at the bedside for them to be available to use at the Information Center. See your IntelliVue Patient Monitor documentation for information on enabling remote controls.</p>	<ul style="list-style-type: none"> • At bedside or Information Center, except for the Compact Configurable Monitor 	<ul style="list-style-type: none"> • At Information Center only 	<ul style="list-style-type: none"> • At Information Center only

Feature	M3 bedside monitors	IntelliVue Patient Monitors	Other bedside monitors	Telemetry	Telemetry with EASI telemetry devices
ST-Segment Monitoring	<ul style="list-style-type: none"> • Provided by bedside monitor • ST analysis is done on up to 3 leads • Waves available at Information Center ST Review Window 	<ul style="list-style-type: none"> • Provided by bedside monitor • Waves available at Information Center ST Review Window 	<ul style="list-style-type: none"> • Provided by bedside monitor • Limited functionality at the Information Center • Waves available at Information Center ST Review Window 	<ul style="list-style-type: none"> • Provided by Information Center for adult patients • ST analysis is done on up to 6 leads • Waves available at Information Center ST Review Window 	<ul style="list-style-type: none"> • Provided by Information Center • ST analysis is done on up to 12 leads • Waves available at Information Center ST Review Window
ST-Segment Controls	<ul style="list-style-type: none"> • At bedside only 	<ul style="list-style-type: none"> • At bedside only 	<ul style="list-style-type: none"> • At bedside • Limited functionality at the Information Center 	<ul style="list-style-type: none"> • At Information Center only 	<ul style="list-style-type: none"> • At Information Center only

Note—When you discharge a patient from the Information Center, the alarm limits and on/off settings controlled from the Information Center go back to unit settings. Please review the Instructions for Use for the monitoring device to determine how to return alarm conditions controlled from the monitor back to unit settings.

Turning Alarms On/Off

The On/Off adjustments for arrhythmia alarms that you can make at the Information Center are:

- Turn all yellow alarm off/on.
- Turn all red and yellow arrhythmia alarm off/on (telemetry) unless your system is configured to not allow this.
- Turn individual yellow arrhythmia alarm off/on.

Note—Red alarms can all be turned off by suspending/pausing alarms (or turning all ECG alarms off), but cannot be turned off individually. If the HR alarm condition is turned off at the bedside monitor, or the alarm condition source is changed to Pulse, all arrhythmia alarm conditions are turned off. See page 4-34 for information on suspending/pausing alarms.

Task Summary

Make adjustments to arrhythmia alarm conditions on the Arrhythmia Alarms Window.

Step	Action
1	Access the Arrhythmia Alarms Window by selecting the Arrhyth Alarms button in the Patient Window.
2	Make the adjustments on the Arrhythmia Alarms Window. The table below describes each of the available adjustments.

Adjustment	Description
Unit Settings	<p>Select this button if you want to return all alarm settings to the pre-set limits for your unit, for example, PVC Rate > 10 PVCs/min.</p> <p><i>Note</i>—This adjustment is not available for IntelliVue Patient Monitors.</p>
All Yellow On/All Yellow Off	<p>Select these if you want to turn on or off all yellow alarms simultaneously. For example, the last shift turned off several yellow alarm conditions, but you are not familiar with the patient's clinical condition and you want all alarms turned on. Rather than turning each individual alarm on, you can use this function to accomplish your goal in one step.</p> <p><i>Note</i>—You can still turn on/off individual alarm after selecting the All Yellow On/All Yellow Off button.</p>

Adjustment	Description
Patient Paced	<p>If the patient has a cardiac pacemaker (including demand, fixed, or any type), there should be a check in the Patient Paced box, indicating that pace pulse detection is On.</p> <p>Warning—If the patient is paced, pace pulse detection must be On, enabling the ST/AR algorithm to detect and reject pace pulses (spikes) from the HR count. Otherwise, pace pulses could be detected as beats and the monitor may not alarm for an asystole condition.</p> <p>Note—If the Patient Paced status is on, the word “Paced” displays in the lower right corner of the sector and on the Patient Window. The word “Paced” is not displayed on consulting beds for Information Centers connected via Philips CareNet.</p>

Adjustment	Description
Analysis	<p>Use this control to specify the type of arrhythmia analysis (and ST analysis, if telemetry) used by the system.</p> <p>Multilead The system uses the primary and secondary leads for arrhythmia analysis. This produces optimal arrhythmia detection. Bedside Monitors: Select the primary and secondary leads at the bedside.</p> <p>Telemetry: Select the primary and secondary leads on the Patient Window.</p> <p>Singlelead The system uses only the primary lead. You may want to choose this type of analysis when it is difficult to provide more than one optimized ECG lead. Make sure that this optimized lead occupies the first ECG channel when you have more than 1 ECG lead displayed.</p>

Adjustment	Description
Analysis (continued)	<p>Arrhythmia Off</p> <p>Select Arrhythmia Off to turn arrhythmia analysis off for bedside-monitored patients or Arrhythmia/ST Off to turn arrhythmia analysis and ST off for telemetry-monitored patients. Consider doing this if:</p> <ul style="list-style-type: none">• arrhythmia monitoring is not appropriate for the patient, or• you are not getting a reliable HR because the signal is below a minimum amplitude, unstable, or contains artifact, <i>and</i> you have tried to improve the system performance by choosing another lead, changing to Singlelead Analysis, and changing electrodes. <p><i>Note</i>—For patients monitored with telemetry EASI ECG, selecting ARRHYTHMIA OFF results in an ARRHYTHMIA REQUIRED INOP/Technical Alarm.</p> <p>If arrhythmia (and ST, for telemetry) analysis is turned off, the INOP/Technical Alarm message “ARRHYTHMIA OFF” appears in the patient sector. The “ARRHYTHMIA OFF” message is not displayed at the bedside.</p> <p><i>Note</i>—Arrhythmia analysis and arrhythmia/ST analysis (for telemetry) may be turned off as a unit setting (for example in a neonatal unit). In this case, it may be turned on for individual patients.</p> <p>See “Arrhythmia Analysis Off” on page 4-23 for important information about no arrhythmia analysis.</p>

Adjustment	Description
All Arrhythmia Alarms Off (telemetry only)	<p>Select this button (check in box) to turn all arrhythmia alarms off. (You still get arrhythmia events stored, and rhythm status displayed when arrhythmia alarms are off.) If your system is configured to not allow the enabling/disabling of all arrhythmia alarms this field is not available (greyed-out) for selection.</p> <p><i>Note</i>—This field is for telemetry monitored patients only, and is for arrhythmia alarm conditions only -- the status of ST alarms is not affected.</p>
All ECG Alarms Off (telemetry only, when Analysis is set to Arrhythmia/ST Off)	<p>When arrhythmia monitoring is turned off, the telemetry cardiotach is used, and the only ECG alarms are HR, ASYSTOLE, and VFIB. Select this button (check in box) to turn these alarms off. If your system is configured to not allow the enabling/disabling of all ECG alarms this field is not available (greyed-out) for selection.</p>
Sound at bedside for ECG yellow alarms (bedside only)	<p>This field applies to bedside monitors only. Setting this to Off inhibits the sound of yellow * arrhythmia alarm conditions but not the alarm messages at the bedside monitor. Alarms sounds and messages will still occur at the Information Center.</p> <p><i>Note</i>—This adjustment is not available for IntelliVue Patient Monitors.</p>

Adjustment	Description
HR Alarm Limits (telemetry and IntelliVue Patient Monitors)	<p>Use these fields to set heart rate alarm limits. You can set the limit based on your assessment of the patient's clinical condition, unit protocols, physician orders or medication specified limits</p> <p>Or, for telemetry bedsides, you can choose Smart Limits. Smart Limits automatically set high and low limits around your patient's current heart rate. The difference above and below the patient's HR is pre-set for your unit. See “Telemetry Smart Limits” on page 4-35 for additional information on using Smart Limits.</p>
Red Alarms	<p>Use these fields to make adjustments to specific red alarm limits. In some cases changing a HR alarm limit will affect other alarm limits. See “Extreme Bradycardia and Extreme Tachycardia Alarms” on page 4-24.</p>
Yellow Alarms	<p>Use these fields to make adjustments to specific yellow alarm limits and to individually turn on/off yellow alarm conditions.</p> <p><i>Note</i>—You cannot turn off or adjust HR limit alarms at the Information Center for bedside monitors other than the IntelliVue Patient Monitor.</p>
Cannot Analyze ECG (sound)	<p>Select this field if you want the Information Center to annunciate an INOP/technical alarm sound when the “Cannot Analyze ECG INOP” occurs. If there is no check for this field, when this INOP/technical alarm occurs, there will be a message, but no sound (and the sector will not turn blue).</p> <p><i>Note</i>—This adjustment is not available for IntelliVue Patient Monitors.</p>

Arrhythmia Analysis Off

This section describes the conditions when arrhythmia analysis or, for telemetry, arrhythmia/ST analysis is turned off.

IMPORTANT: If arrhythmia is turned off, the bedside cardioteach is used. If arrhythmia/ST is turned off, the telemetry cardioteach is used, and there is no ST monitoring.

- The only available ECG alarms are: HR limit, Asystole, and VFIB.
- There are no telemetry ST alarms.

The following controls on the Arrhythmia Alarms Window are available (others are greyed out -- for example, alarm limits controls).

- The Analysis control is active so that arrhythmia can be turned back on.
- For bedsides, no other controls are active -- changing HR limits and turning HR alarms off must be done at the bedside.
- For telemetry, the following controls are active:
 - Patient Paced (can also be changed in the Admit Window).
 - “All ECG Alarms Off” if enabled in configuration (so that you can turn off the telemetry HR alarms).
 - HR alarm limit controls except Smart Alarms. (HR limits can also be changed on the Patient Window.)

Note—When arrhythmia is turned off, pace pulse detection is controlled by the bedside/telemetry cardioteach and is automatically set to ON. If the patient is not paced, turn pacing detection off at the bedside (this setting will not be reflected on the Arrhythmia Alarms Window). For telemetry the pacing controls at the Information Center are active.

If arrhythmia (and ST, for telemetry) analysis is turned off, the INOP/technical alarm message “ARRHYTHMIA OFF” appears in the patient sector at the Information Center. This message is not displayed at the bedside.

The Arrhythmia Analysis control returns to the unit setting when the patient is discharged from the Information Center (except M3 beds or when changing equipment from an IntelliVue Patient Monitor to telemetry), as do the other arrhythmia controls. Arrhythmia can also be manually turned back on in the Arrhythmia Alarms Window. You cannot turn Information Center arrhythmia analysis off or on at the bedside.

Alarm Adjustment Effects

In some cases changing an arrhythmia alarm limit at the Information Center will affect other alarm limits.

Extreme Bradycardia and Extreme Tachycardia Alarms

The difference between the low HR alarm limit and the extreme bradycardia limit is unit configured. For example, if the low alarm limit is 60 b/min and the extreme bradycardia limit difference is configured to be 20 b/min, then the extreme bradycardia limit is 40 b/min. If the difference is configured to be 0, there will always be an extreme bradycardia alarm when the HR falls below the HR low limit.

The same is true for the difference between the high HR alarm limit and the extreme tachycardia limit. In the same way, the extreme tachycardia limit is determined from the high HR limit.

For safety, the extreme bradycardia and extreme tachycardia limits clamp at a configured value. For example, the extreme bradycardia limit for neonates has a default limit clamp at 70 b/min. Thus if the HR low alarm limit is moved to 80 b/min and the extreme bradycardia limit difference is 20 b/min, the extreme bradycardia limit will be 70 b/min. However, if the clinician moves the HR low alarm limit to 65, the extreme bradycardia limit will also be 65 and only the extreme bradycardia alarm will occur if the HR falls below this limit.

See Chapter 9, “Information Center Configuration” for the extreme bradycardia and extreme tachycardia limit difference defaults, clamps, extreme bradycardia trigger time, and ranges.

Timeout Periods

Overview

Normally, an arrhythmia alarm is annunciated upon the detection of an alarm condition. However, there are certain situations that can inhibit the audible and visible indications of the alarm even though the alarm condition was detected. These situations include:

- A more serious alarm condition is active.
- A timeout period is in effect for a higher priority alarm condition in that chain. See “Alarm Chaining” on page 4-26.
- A timeout period is in effect for that alarm condition.

Timeout periods and alarm priority chains are explained below.

When a yellow arrhythmia alarm is annunciated, it automatically initiates a timeout, or inhibitory period. This means that during the timeout the same alarm condition or another condition lower on the same alarm priority chain will not annunciate an alarm during the timeout period. If the timeout period is set to 0, the alarm is immediately reset when the alarm condition is no longer active. The length of the timeout period is configured for your unit.

When the timeout period has expired, the system is reset, and if the condition persists, the alarm condition will be annunciated again.

There are two levels of timeout periods:

- First level (configured to 0, 1, 2, 3, 4, or 5 minutes) applies to all yellow ECG alarm conditions that are above Vent Bigeminy on the priority chain (Non Sustain VT, Vent Rhythm, Run PVCs, Pair PVCs, R-T PVCs, Pacer Not Capture, Pacer Not Paced, Pause SVT, HR>, HR<). See page 4-28 for an illustration of the alarm condition priority chain.
- Second level (configured to 0, 1, 2, 3, 4, 5, 10, or 15 minutes) applies to Vent Bigeminy and all alarm conditions that are below Vent Bigeminy on the priority chain (Vent Bigeminy, Vent Trigeminy, PVCs >xx/min, Multiform PVCs, Irregular HR). See page 4-28 for an illustration of the alarm condition priority chain.

If the timeout period is set to 0 and your system is configured for alarm reminders, the alarm reminder for that level will sound every three minutes while the alarm condition remains active (if configured). See “Alarm Reminders” on page 4-32 for information on alarm reminders.

Clearing the Timeout Period

The timeout period is cleared if it is ended or a learning phase occurs. See “Learning” on page 5-17 for information on learning.

Note—A superseding alarm does not clear the timeout period.

Alarm Chaining

Overview

For arrhythmia alarms, the presence of multiple alarm conditions is quite possible. Announcing all of the detected alarm conditions would be confusing, and less serious conditions might hide a more serious condition. For this reason, the alarms are prioritized and put in alarm “chains” so that the most serious or highest priority alarm condition is announced. The diagram on page 4-28 shows the alarm priority chains.

Alarm Groupings

The alarm conditions detected by the ST/AR Arrhythmia system are grouped into the following categories:

- PVC Alarms (for example, Pairs, Vent Rhythm)
- Beat Detection Alarms (for example, Pause, Pacer Not Capt)
- Rate Alarms (for example, Extreme Tachy, High/Low HR)

Alarm Announcing

The Information Center displays and announces:

- Life threatening (red) alarms are announced first, since they have the highest priority level.
- If there are no life threatening red alarm conditions active, the highest priority yellow alarm in any chain is announced.
- If alarm conditions in different chains are detected, the alarm condition that occurred most recently is announced. The exception is Irregular HR, which only annunciates if no other alarms are annunciating.

Alarm Behavior and Timeout periods

During a timeout period for a particular alarm condition the re-occurring alarm condition or a lower priority alarm condition in the same chain will not annunciate. However, alarm conditions in another priority chain will still annunciate. Once a timeout period is completed any active alarm conditions will annunciate. For example, if there is an active Vent Bigeminy alarm, a PVCs > xx/min will not become active because it is lower on the same chain. However, a high HR alarm will become detected because it is on another chain.

Higher priority alarms will supersede the previous alarm condition and the higher priority alarm condition will annunciate. For example, if a Vent Trigeminy alarm is active and a Pair PVCs occurs, the Pair alarm will be annunciated. Only one arrhythmia alarm can be annunciated for a patient at any one time.

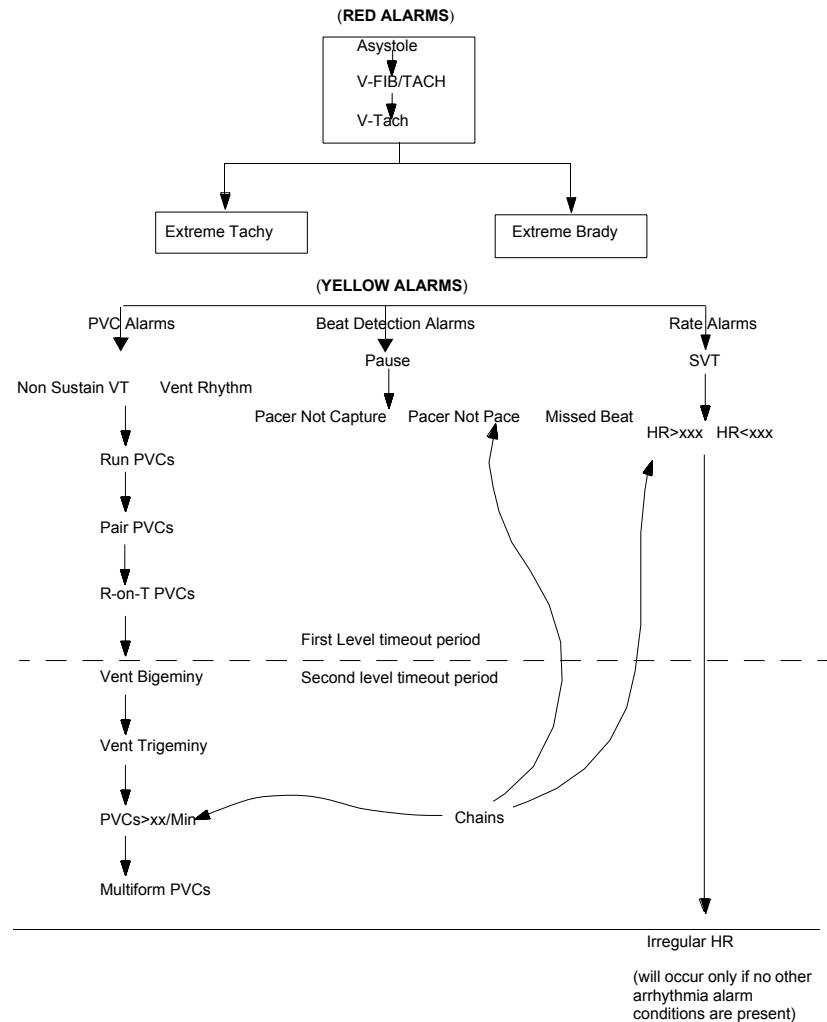
The alarms in each chain are prioritized according to the relative level of seriousness.

You can view arrhythmia alarm activity in the Patient Data Review applications. See Chapter 6, “Patient Data Review,” for information on Data Review applications.

Alarm
Priority
Chains

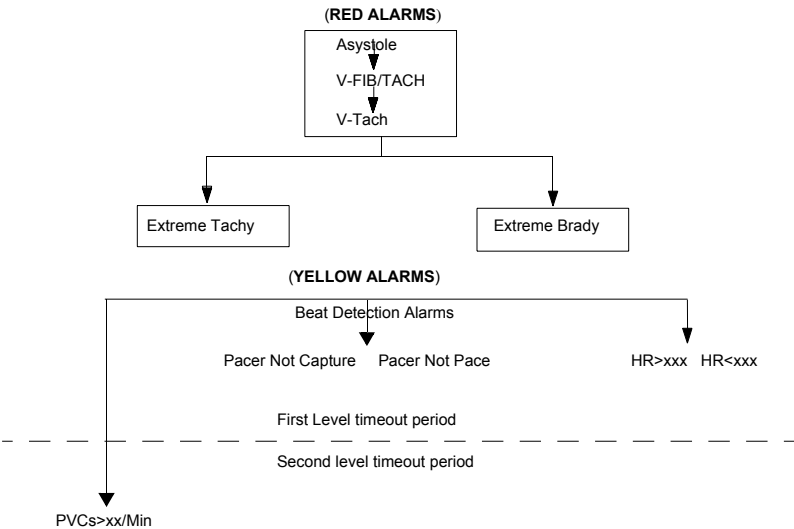
Enhanced Arrhythmia

The diagram below shows the alarm condition priority chains for enhanced arrhythmia. The alarm conditions in each category are prioritized according to the level of seriousness (see “Levels of Arrhythmia Analysis” on page 5-3).



Basic Arrhythmia

The diagram below shows the alarm condition priorities for basic arrhythmia and the timeout levels for yellow alarm conditions.



Silencing Alarms

Overview

Alarm conditions generated from bedside monitors can be configured to allow or not allow acknowledgment from the Information Center. Alarms are acknowledged at the Information Center by using the Silence button (selecting Suspend/Pause can also acknowledge an active alarm see page 4-34). Alarms for telemetry-monitored patients can only be silenced from the Information Center or Information Center Client (if configured for Full Control). Silencing an alarm condition at the Information Center turns off the audible annunciation of an alarm condition.

Note—For IntelliVue Patient Monitors, if the bedside is configured for audible non-latching and visual latching alarms and the alarm condition no longer exists the alarm text will remain at the Information Center but Silence button will not be available. You must go to the bedside to clear the alarm text for both the bedside and the Information Center. See your bedside documentation.

Alarm Behavior

If the alarm annunciation is silenced:

- *If the alarm condition is present*, the blue background goes away, but the alarm condition message remains until the condition ends or the timeout period is over. When the timeout period is over if the condition is present or re-occurs the alarm is annunciated. There is no additional audible tone, unless alarm reminders are configured.
- *If the alarm condition is no longer present*, the alarm indicators are automatically reset.

Warning

If alarm annunciation is silenced and alarm reminders are configured off, the alarm condition message will persist until the condition ends but there will be no audible alarm annunciation.

If the alarm is NOT silenced:

The alarm behavior depends on the type of alarm condition and how your alarm system is configured. The table below describes the alarm system behavior for each type of alarm condition.

Type of Alarm Condition	What happens when alarm condition ends
Red arrhythmia alarms	Alarm indicators (sound, message, blue highlighting in sector) remain, whether or not the condition is present (latching).
Yellow arrhythmia alarms	<p>Alarm indicators (message, blue highlighting in sector) are active for a 3-minute period after the alarm is announced.</p> <ul style="list-style-type: none"> • <i>If the alarm condition ends during this period</i>, the alarm indicators remain until the 3-minutes are over, then go away. • <i>If the alarm condition remains after this period</i>, the indicators remain until the condition clears. • <i>If the alarm condition ends after this period</i>, the alarm indicators are automatically reset.
INOPs/technical alarms-arrhythmia and telemetry	Alarm indicators are automatically reset after the condition ceases (non-latching).
Telemetry ST, NBP, and SpO ₂ alarms	<p>With the Philips Telemetry System, alarm indicators are automatically reset (non-latching).</p> <p>With the Philips IntelliVue Telemetry System, alarm indicators can be configured to be latching or non-latching. The default is latching, alarm indicators remain whether or not the condition is present.</p>
Alarms generated at the bedside	Alarm indicators (sound, message, blue highlighting in sector) will be automatically reset (non-latching) or will remain (latching), depending on how the alarms are configured at the bedside.

Alarm Reminders

Red Alarms

If your Information Center is configured to have alarm reminders, when an active alarm condition is silenced and the condition persists, the Information Center repeats the appropriate alarm sound once every three minutes while the alarm condition remains present.

Only one alarm sound can annunciate at one time. Therefore, if a continuous red alarm is annunciating for another patient the red alarm reminder will not sound until the previous alarm sound has cleared. However, if a continuous yellow alarm is annunciating, the red alarm reminder will annunciate (interrupting the yellow alarm).

Yellow Alarms

If a yellow arrhythmia alarm is continuous (for example, IRREGULAR HR), an alarm reminder will sound every 3 minutes as long as the condition exists if:

- Reminders are configured
- Timeout is set to 0

Yellow arrhythmia alarm reminders also affect ST alarm indicators. If configured, after the alarm has been silenced, an alarm reminder will sound every 3 minutes as long as the condition exists (see page 4-25).

INOPs/Technical Alarms (telemetry beds only)

If your Information Center is configured to have INOP reminders, the hard INOP alarm sound for either LEADS OFF or REPLACE BATTERY repeats once every three minutes while the INOP condition remains active and if there are no continuous alarm sounds for other patients.

Task Summary

When there is an annunciating alarm condition, the **Record**, **Record and Save**, or the **Save** button in the Patient Sector changes to enable the clinician to silence the active alarm. The label and action of the button depends on whether or not Fast Alarm Review is enabled.

Note—Your unit may be configured to not allow silencing of bedside-generated alarm conditions at the Information Center. In this case, a Silence button would not appear. If the bedside monitor is M3 or IntelliVue Patient Monitor, both the monitor and the Information Center must be configured to allow silence of bedside-generated alarm conditions. Otherwise, the **Silence** button appears, but is not operative.

Fast Alarm Review Disabled

If Fast Alarm Review is not enabled, the button changes to **Silence**. The clinician can silence the alarm condition by selecting the **Silence** button or by clicking or, for touch screen displays, touching anywhere in the Patient sector, except the **Patient Window** button.

Fast Alarm Review Enabled


If Fast Alarm Review is enabled, the button changes to **Silence/Review**. Selecting the button silences the alarm and opens a Patient Window with the Fast Alarm Review strip for that alarm. See Chapter 6, “Patient Data Review” for information on using Fast Alarm Review. If there is an application window open for any patient, when the **Silence/Review** button is selected, the Fast Alarm Review strip overlays it.

- This capability can be enabled for red alarm conditions only, or for red and yellow alarm conditions.
- To silence the alarm condition without displaying it, just click anywhere in the Patient Sector except the **Patient Window** button or **Silence/Review** button. Or, for touch screen displays, touch anywhere in the Patient Sector except on the **Patient Window** button or **Silence/Review** button.
- If the clinician selects the **Silence/Review** button for another alarm condition, the new one is displayed, and the current one is closed.

Note—If 15 seconds of data that preceded the alarm condition are not available when an alarm condition is announced, the button label is **Silence**. Selecting it silences the alarm condition, and no Fast Alarm Review strip is displayed. The waves for that alarm condition can be viewed in Alarm Review (if the alarm condition was set up to be stored) or in Wave Review.

Suspending/Pausing Alarms


Telemetry


The **Suspend/Pause** and **Unsuspend/Resume** buttons on the Patient Window allow you to turn all alarm sounds off/on for telemetry-monitored patients. When you suspend the alarm sound, a  appears in the patient sector and Patient Window next to all numerics indicating that all alarm sounds are off for this patient. You also get the message “ALARMS SUSPENDED” or “ALARMS PAUSED”.

The number of minutes that the telemetry alarms remain suspended depends on the configuration (see the *Philips Telemetry System Instructions for Use*). If your unit is configured to suspend/pause alarms for 3 minutes, the alarms automatically turn back on after the 3 minutes elapses. If your unit is configured to suspend/pause alarms for an infinite amount of time, you must manually turn the alarms back on.


Note—The alarms suspended/paused status does not change when a patient is discharged. If alarms are suspended, they remain suspended after the discharge.

Bedside Monitors

You suspend/pause alarms for bedside monitors at the monitor. When alarms are suspended/paused, at the Information Center the “ALARMS SUSPENDED” or “ALARMS PAUSED” message is displayed and a  symbol appears next to all parameter numerics.

Note—For M3 bedside monitors, the  symbol only appears next to the numerics for parameters whose alarms were turned off individually.

TeleMon

When a telemetry device is docked at TeleMon, you suspend/pause alarms at TeleMon. Alarms are suspended for three minutes, then turn back on automatically. When alarms are suspended, at the Information Center the “ALARMS SUSPENDED” or “ALARMS PAUSED” message is displayed and a  symbol appears next to all parameter numerics.

Telemetry Smart Limits

Overview

When setting heart rate or ST alarm limits you can set the limit based on your assessment of the patient's clinical condition, unit protocols, physician orders or medication specified limits or you can choose Smart Limits.

Smart Limits are set around the patient's current numeric values. The amount above and below the current value (the offset) is configured for the unit and cannot be adjusted on a per patient basis. You can set Smart high and low limits for HR and ST only.

When activated, Smart Limits are rounded to the nearest 5 b/min for HR and the nearest .2 mm for ST.

Automatically Set Smart Limits

Smart alarm limits can be configured for the unit to be automatically set when:

- When parameter is turned on (ST only).
- The telemetry bed is taken out of standby.
- At discharge.

Note—At discharge, it is important to first remove the patient from the telemetry device, then discharge the patient from the Information Center. Since there is no HR coming from the patient on discharge, although Smart Limits have been activated, no Smart Limits are set. When a new patient is attached to the telemetry device and a HR becomes available, Smart Limits are set on that HR and ST. If the patient continues to send a HR when you discharge, Smart Limits will be set on the HR and when a new patient is admitted the alarms will be based on the previous patient's values.

When Smart Limits are automatically activated, the unit offset is bound by the configured unit settings. In this way, Smart Limits will never automatically be set outside the unit settings.

Manually Set You can manually set Smart Limits from the Arrhythmia Alarms Window or ST Alarms Window. In this case, Smart Limits are *not* bound by the unit settings. However, outside of the unit settings, a tighter offset is used. See Chapter 9, “Information Center Configuration” for a list of factory default offsets and offset ranges.

Smart Limits Examples Below are examples of how manually set Smart Limits work.

Example of Smart Limits Inside Unit Settings

Unit setting high HR limit = 150

Unit setting low HR limit = 50

Offset **inside** unit settings = +/- 25

Offset **outside** unit settings = +/- 10

Current HR = 80

Produces:

High HR limit set to $80 + 25 = 105$

Low HR limit set to $80 - 25 = 55$

Examples of Smart Limits Outside Unit Settings

Example 1

Unit setting high HR limit = 150

Unit setting low HR limit = 50

Offset **inside** unit settings = +/- 25

Offset **outside** unit settings = +/- 10

Current HR = 55

Produces:

High HR limit set to $55 + 25 = 80$

Low HR limit set to $55 - 10 = 45$

Note—In this example, the current HR less the offset of 25 would fall outside the unit setting. Therefore, the offset outside the unit setting (10) is used.

Example 2

Unit setting high HR limit = 150
Unit setting low HR limit = 50
Offset **inside** unit settings = +/- 25
Offset **outside** unit settings = +/- 10
Current HR = 65

Produces:


High HR limit set to $65 + 25 = 90$

Low HR limit set to $65 - 10 = 55$ (System uses 50. See note below.)

Note—In this example, the current HR less the outside offset would result in a low limit of 55. However, the system uses the unit setting of 50, since this is a wider limit.

Adjusting the Alarm Tone Volume

To adjust the alarm tone volume perform the following steps:

Step	Action
1	On the Patient Window select the All Controls button.
2	On the All Controls Window select the Volume Control button. <i>Note</i> —Alternatively, you can double-click the volume symbol  in the upper-right-hand corner of the resting display.
3	Place your cursor over the number in the Current Volume box and use the pop-up arrows to adjust the volume up or down. At the lowest volume, the tone is still audible. To hear the volume you are selecting, select Test Volume While Setting. If there is an alarm sounding, the alarm volume will change accordingly. If there is no alarm sounding, there will be a short sound to indicate the volume. <i>Note</i> —The alarm tone volume cannot be set to zero.
4	If you want to return the volume back to the default unit setting select the Set to Default button.

Recording/Storing Alarms

Overview

The Record/Store/Page Alarms Window allows you to:

- Turn alarm recording on/off for individual patients.
- Turn alarm storage on/off for individual patients.
- If paging is available on your system, specify the alarms that will generate an automatic page for a patient. See “Specifying Alarms for Automatic Paging” on page 7-9.

Turning off recording or storage does not effect audible and visual indicators for these alarms.

Record determines which recordings start when the alarm is sounded. Store determines which alarm strips the Information Center stores in memory for review later in the Alarm Review Window.

Note—You can inhibit the recording of red alarms but not the storage.

Task
Summary

Perform the following steps to turn recording and storage on/off:

Step	Action
1	On the Patient Window select the All Controls button.
2	On the All Controls Window select the Record/Store/Page button under Alarm Management and Setup.
3	<p>On the Record/Store/Page Alarms window specify which alarms to record or store by selecting the appropriate check box to the left of the alarm. A check mark in the box selects the alarm for recording/storage.</p> <p>Storage of Red alarms cannot be turned off.</p> <p><i>Note</i>—If the Information Center is not the primary monitor, there may be fewer/more alarms listed on the Record/Store/Page Alarms window than the primary Information Center can provide. For example, the primary Information Center may be configured for basic yellow arrhythmia alarms, and your Information Center may be configured for enhanced alarms. The Arrhythmia Alarms Window must be reviewed to determine which alarms are available for this patient.</p> <p><i>Note</i>—For All Red Non-Arrhythmia Alarms or All Yellow Non-Arrhythmia Alarms: if set to Off, no recordings are generated. If set to On, only the alarms set to be recorded by the bedside will generate recordings.</p>

Storage of
Arrhythmia
Alarms at
the
Information
Center

If there is an arrhythmia alarm, and a superseding arrhythmia alarm occurs within six seconds of it, the system only stores the latest alarm. For example, if there is a PAUSE alarm, and in six seconds it is superseded by ASYSTOLE, the system will only store the ASYSTOLE alarm.

Note—For patients on M3 or IntelliVue Patient Monitors, superseding alarms are treated as separate alarms. In the example above, two alarms (the PAUSE alarm and the ASYSTOLE alarm) will be stored.

5

ST/AR Arrhythmia Monitoring

This chapter describes the ST/AR arrhythmia algorithm. It includes the following sections:

- Introduction. 5-2
- Levels of Arrhythmia Analysis. 5-3
- How the ST/AR Algorithm Works. 5-5
- Paced Patients. 5-14
- Learning 5-17
- Monitoring During Leads Off. 5-19
- Status Messages 5-20
- False Alarms 5-24

Introduction

Overview

The intended use of the ST/AR arrhythmia algorithm is to monitor adult, pediatric, and neonatal (not telemetry) patients' ECGs for heart rate and ventricular arrhythmias and produce events/alarms for one or two ECG leads. The ST/AR arrhythmia algorithm is capable of monitoring both paced and non-paced patients.

The Information Center provides ST/AR arrhythmia monitoring for patients that are either on bedside monitors or telemetry that are connected to the Philips monitoring network. You can use arrhythmia analysis to aid in assessment of a patient's condition (for example, heart rate, PVC rate, rhythm, ectopics) and manage treatment accordingly. In addition to detecting changes in the ECG, it also offers patient surveillance and alarm generation.

M3 Bedside Monitors

If the patient is monitored by a M3 monitor, arrhythmia monitoring is done at the bedside monitor. See your M3 user documentation for information specific to the M3 monitors.

IntelliVue Patient Monitors

If the patient is monitored by a IntelliVue Patient Monitor, ST/AR arrhythmia algorithm is provided by the IntelliVue Patient Monitor. Controls, however, for arrhythmia analysis and alarm limits are adjustable and viewable at both the Information Center and the IntelliVue Patient Monitor. The level of arrhythmia analysis between the IntelliVue Patient Monitor and the Information Center may differ. The level of arrhythmia analysis on the monitor (basic or enhanced) will determine the level of arrhythmia analysis performed for that patient. See your IntelliVue Patient Monitor user documentation for information specific to IntelliVue Patient Monitors.

Warning

During complete heart block or pacemaker failure (to pace or capture), tall P-waves (greater than 1/5 of the average R-wave height) may be erroneously counted by the arrhythmia algorithm, resulting in missed detection of cardiac arrest.

Levels of Arrhythmia Analysis

The number of rhythms being classified, events being detected, and alarms being called depends on whether your system is configured for basic or enhanced arrhythmia capability. The sections that follow describes each of these options.

Basic Arrhythmia

The basic arrhythmia capability configuration provides the basic cardiotach functions of heart rate and PVC rate, beat annotation, and the detection of the 10 alarms listed below.

- Asystole
- Ventricular Fibrillation
- Ventricular Tachycardia
- Extreme Tachycardia
- Extreme Bradycardia
- Pacer Not Capture
- Pacer Not Paced
- Frequent PVCs (PVC > limit)
- High heart rate
- Low heart rate

Enhanced Arrhythmia

The enhanced arrhythmia capability configuration provides all of the basic functions, as well as the detection of the 12 additional alarms listed below. In addition it provides rhythm and ectopic status messages.

Basic Alarms

- Asystole
- Ventricular Fibrillation
- Ventricular Tachycardia
- Extreme Tachycardia
- Extreme Bradycardia
- Pacer Not Capture
- Pacer Not Paced
- Frequent PVCs (PVC > limit)
- High Heart Rate
- Low Heart Rate

Additional Alarms

- Nonsustained V-Tach
- Supraventricular Tach
- Ventricular Rhythm
- Run PVCs
- Pair PVCs
- Pause
- R-on-T PVCs
- Ventricular bigeminy
- Ventricular trigeminy
- Multiformal PVCs
- Missed Beat
- Irregular HR

How the ST/AR Algorithm Works

Overview

ST/AR multi-lead analysis is performed on the user-selected primary and secondary leads. If only one lead is available for multilead, ST/AR analysis is performed on the single available lead.

Arrhythmia analysis consists of several steps:

1. The ECG signal is pre-processed to filter out baseline wander, muscle artifact, and signal irregularities. In addition, if the Patient Paced status = Yes, pace pulses are detected then rejected from the processing to avoid seeing them as QRS beats.
2. Beat detection to locate the QRS complexes for further analysis.
3. Feature measurement such as R-wave height, width, and timing.
4. Beats classification. Templates are created and are matched to incoming beats, and the appropriate beat label is determined.
5. Rhythm and alarm detection. Beat labels are used to produce the values and events needed to generate rhythms and alarms.

Working in parallel with beat detection and classification, a separate detector examines continuously for ventricular fibrillation, asystole, and noise.

The quality of the ECG signal is important for accurate arrhythmia analysis. The section below provides guidelines for optimizing signals for arrhythmia analysis.

**Ensuring
Accurate
Arrhythmia
Monitoring**

For accurate arrhythmia monitoring make sure the ECG waves are optimized for arrhythmia monitoring by performing the following steps:

Step	Action
1	Once you have selected the optimal lead at the bedside monitor (or at the Information Center for telemetry), check the arrhythmia alarm limits by selecting Arrhyth Alarms on the Patient Window and reviewing the limits in the Arrhythmia Alarms Window. <i>Note</i> —See page 5-11 for examples of optimized leads.
2	Verify that the patient paced setting is accurate. (If pacing detection is on, the word “Paced” should appear in the Patient Window.) Change if necessary.

Step	Action
3	<p>Check the arrhythmia beat labels by selecting Arrhythmia Analysis on the Patient Window. The beat labels indicate how the arrhythmia system is classifying beats.</p> <p>N = Normal V = Ventricular Ectopic S = Supra-ventricular Premature P = Paced ' = Pacer spike (If the patient is both atrially and ventricularly paced, the system will show two ' marks above the waveform aligned with the atrial and ventricular pacing.) L = Learning patient's ECG A = Artifact (noisy episode) ? = Insufficient information to classify beats I = Inoperative condition (e.g., LEADS OFF) M = Pause or missed beat</p> <p>When you select the Arrhythmia Analysis button you get one or two waves that are delayed by approximately 6 seconds.</p> <p>In multilead analysis, when you select the Arrhythmia Analysis button you get up to two waves. The primary lead and the other lead being used for arrhythmia analysis are both displayed. The primary wave shows the delayed lead with beat labels. The beat labels represent analysis of both the primary and secondary waves.</p> <p><i>Note</i>—In multilead analysis, the Information Center displays two waves for locally connected patients. If, however, you are viewing a patient monitored by another Information Center, the system displays only the primary wave with beat labels.</p>

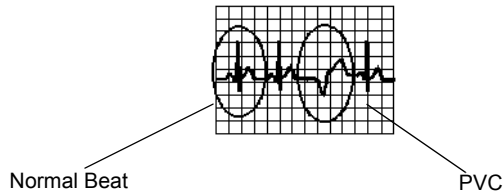
Step	Action
4	<p>If you don't agree with how beats are labeled, you can cause arrhythmia to relearn the ECG by selecting the Relearn button. During the learning process beats are labeled with the letter L for the first valid 15 beats. The beat shape is then learned and a new template is created. If the beats that are classified as N (normal beat) look similar to the patient's ventricular ectopic beats you should change the lead to one where the normal and ventricular beats look different (see page 5-11).</p> <p><i>Note</i>—Initiate learning only during periods of predominantly normal rhythm and when the ECG signal is relatively noise-free. See “Learning” on page 5-17 for additional information the learning process.</p> <hr/> <p>Warning</p> <p>If you initiate learning during ventricular rhythm the ectopics may be incorrectly learned as the normal QRS complex. This may result in missed detection of subsequent events of V-Tach and V-Fib.</p> <hr/> <hr/> <p>Warning</p> <p>When using EASI ECG monitoring, Relearn happens automatically when there is a LEADS OFF INOP condition (see “Monitoring During Leads Off” on page 5-19). If learning takes place during ventricular rhythm, the ectopics may be incorrectly learned as the normal QRS complex. This may result in missed detection of subsequent events of V-Tach and V-Fib. Be sure to check the beat labels and initiate a relearn to correct</p> <hr/> <hr/>
5	<p>After relearning is complete, check the delayed arrhythmia wave to ensure that the algorithm is labeling the beats correctly.</p>
6	<p>If beats are still not classified correctly, check that the ECG is optimized for arrhythmia monitoring by changing the lead(s) or moving the electrodes, if needed. See page 5-11 for examples of optimized ECGs.</p>

Step	Action
7	<p>For telemetry and bedsides other than the M3 or IntelliVue Patient Monitor, if changing the lead does not provide accurate analysis of the beats the minimum threshold for single QRS detection can be adjusted manually by:</p> <ol style="list-style-type: none">1. Selecting Manual in the QRS Detection box in the bottom of the Arrhythmia Analysis window.2. If using Multilead Analysis, choosing whether to use the primary or secondary lead for QRS detection by selecting the lead from the Lead drop-down list.3. Using the up and down arrows to move the horizontal cursor bars to the desired detection threshold. <p><i>Note</i>—When making manual adjustments be sure to place measurements off the P and T waves capturing the QRS complex.</p> <ol style="list-style-type: none">4. Verifying selections then selecting the Update button to activate the measurement.

Step	Action
8	<p>If you want to view all leads that can be obtained from the patient's ECG, select the Multilead ECG button on the Patient Window. This accesses a window showing a few seconds of wave for all available leads, plus a 10-second rhythm strip.</p> <ul style="list-style-type: none"> • If only one lead is sourced then only one lead displays. • If two leads are being sourced and one of the leads is a chest lead then the two leads are displayed. If both leads are limb leads then six leads are displayed. <p>To:</p> <ul style="list-style-type: none"> • View the most recent ECG data -- select Update Waves. • Change the wave layout -- click on or, for touch screen displays, touch the wave layout on the top right side of the window then select the wave format (3x4, 6x2, or 12x1) from the list that displays. In 3x4 layout an additional rhythm lead displays • Change the size of the waves -- click on or, for touch screen displays, touch the cal bar then select the size of the wave you want from the list that displays (x1/2, x1, x2, x4). • Change the wave speed (25 mm/s or 50 mm/s) -- click on or, for touch screen displays, touch the speed on the bottom right of the window then select the speed from the list that displays. When you select a different speed the window re-displays with the selected speed. • Print a snapshot of the leads -- select the Print button on the top of the window. <p>Note—If the bedside or telemetry system has EASI 12-lead capability, select the 12-Lead ECG button. All 12 derived leads will be displayed, enabling you to determine the optimal leads. For information on using the 12-Lead ECG Window, see “EASI 12-lead Review and Report” on page 1-31.</p>

Example of Optimized Non-Paced ECG

The graphic below shows an ECG optimized for arrhythmia monitoring a non-paced patient.



Normal QRS:

- Tall (recommended amplitude $> 0.5\text{mV}$), narrow, with R-wave above or below the baseline (but not biphasic)
- T-wave smaller than $1/3$ R-wave height; P-wave smaller than $1/5$ R-wave height

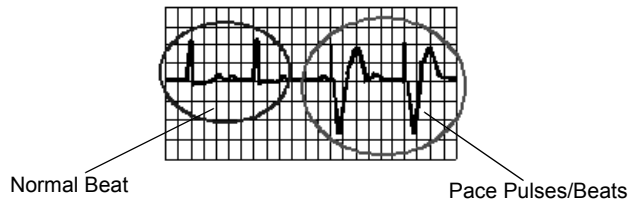
Note—In order to comply with the AAMI-EC13 specification, ST/AR internally removes the gain adjustment before the signal is analyzed for detection and classification. The detection threshold for the QRS cannot be less than 0.15 mV . This specification is aimed at preventing the detection of P-waves or baseline noises as QRS complexes during complete heart block or asystole. This increasing or decreasing of the gain has no effect on the ECG size for QRS detection. Therefore, for optimal performance and to prevent false alarms such as pause or asystole, it is important that leads selected for monitoring are optimized.

Ectopic beats:

- PVCs wider and different shape from normal beats
- PVCs not too tall or too small compared to the normal beat

**Example of
Optimized
Paced ECG**

The graphic below shows an ECG optimized for arrhythmia monitoring a paced patient.



Normal QRS:

- Tall (recommended amplitude $> 0.5\text{mV}$), narrow, and above or below the baseline (not biphasic)
- T-wave smaller than $1/3$ R-wave height; P-wave smaller than $1/5$ R-wave height

Ventricular paced beats:

- Paced beat not much larger than the normal QRS, and taller than pace pulse
- Paced beat wider than Normal QRS
- Pace pulse large enough to be detected, with no width (no re-polarization)

**Aberrantly
conducted
beats**

Since P-waves are not analyzed, it is difficult and sometimes impossible for a monitoring system to distinguish between an aberrantly conducted supraventricular beat and a ventricular beat. If the aberrant beat resembles a ventricular morphology, it is classified as ventricular. You should always select a lead where the aberrantly conducted beats have an R-wave that is as narrow as possible to minimize incorrect calls. Any ventricular beats should look different from these 'normal beats'. Instead of trying to select two leads with a narrow R-wave, it may be easier to just select one lead and use the single lead arrhythmia monitoring option. Extra vigilance is required by the clinician for this type of patient.

**Atrial
Fibrillation and
Flutter**

Since P-wave morphology is not analyzed, there is no method to discriminate atrial rhythms. If there is constant variance in the R-R interval, the rhythm is classified as Irregular.

It is extremely important for accurate analysis of the rhythm to have p-waves with an amplitude of less than 1/5 the height of the R-wave or < 0.150 mVolts. If the p-waves are larger than this there is the possibility they can be counted as QRS complexes.

**Intermittent
Bundle Branch
Block**

The phenomenon of bundle branch or any of the other fascicular blocks creates a challenge for the arrhythmia algorithm. If the QRS during the block changes considerably from the learned normal, the blocked beat may be incorrectly classified as ventricular, causing false PVC alarms. You should always select a lead where the Bundle branch block beats have an R-wave that is as narrow as possible to minimize incorrect calls. Any ventricular beats should look different from these 'normal beats'. Instead of trying to select two leads with a narrow R-wave, it may be easier to just select one lead and use the single lead arrhythmia monitoring option. Extra vigilance is required by the clinician for this type of patient.

Paced Patients

Overview

When monitoring paced patients, it is important to set the pacing status correctly to enable pace pulse detection. For M3 bedside monitors, you must change the pacing status at the bedside monitor. For all other point-of-care equipment, you can change pacing status at the Information Center in either the Admit Window or the Arrhythmia Alarms Window. When the pacing status is on, the text “Paced” displays in the lower right corner of the patient sector and the upper left corner of the Patient Window.

Warnings for Paced Patients

Some pace pulses can be difficult to reject. When this happens, the pulses are counted as a QRS complex, and could result in an incorrect HR and failure to detect cardiac arrest or some arrhythmias. Keep pacemaker patients under close observation.

- **During complete heart block or pacemaker failure (to pace or capture), tall P-waves (greater than 1/5 of the average R-wave height) may be erroneously counted by the arrhythmia algorithm, resulting in missed detection of cardiac arrest.**
- **When arrhythmia monitoring paced patients who exhibit only intrinsic rhythm, the monitor may erroneously count pace pulses as QRS complexes when the algorithm first encounters them, resulting in missed detection of cardiac arrest.**

For patients who exhibit intrinsic rhythm only, the risk of missing cardiac arrest may be reduced by monitoring these patients with the low heart rate limit at or slightly above the basic/demand pacemaker rate. A low heart rate alarm alerts you when the patient begins pacing. Proper detection and classification of the paced rhythm can then be determined.

- **Pacemaker pulses may not be detected when the output of a defibrillator or telemetry unit is plugged into a bedside monitor. This may result in the arrhythmia algorithm's failure to detect pacemaker non-capture or asystole.**

Instruments such as defibrillators or telemetry units produce a filtered ECG signal. When this signal is used as an input to the bedside monitor, it is filtered again. If this twice-filtered signal is passed to the arrhythmia algorithm, it may cause the algorithm to fail to detect pace pulses thus compromising paced patient monitoring performance.

- **When an external pacemaker is being used on a patient, arrhythmia monitoring is severely compromised due to the high energy level in the pacer pulse. This may result in the arrhythmia algorithm's failure to detect pacemaker noncapture or asystole.**
- **Pacemakers can be susceptible to radio frequency (RF) interference which may temporarily impair their performance.**

The output power of telemetry devices and other sources of radio frequency energy, when used in the proximity of a pacemaker, may be sufficient to interfere with the pacemaker's performance. Due to the shielding effects of the body, internal pacemakers are somewhat less vulnerable than external pacemakers. However, caution should be exercised when monitoring any paced patient.

Consult the pacemaker manufacturer for information on the RF susceptibility of their products and the use of their products with the telemetry devices.

In order to minimize the possibility of interference, position electrodes, electrode wires, and telemetry device as far away from the pacemaker as possible.

Repolarization Tails

Some unipolar pacemakers display pace pulses with repolarization tails. These tails may be counted as QRSs in the event of cardiac arrest or other arrhythmias.

If you note a visible repolarization tail, choose a lead that decreases the size of the repolarization tail.



Learning

Overview

The arrhythmia system's goal is to learn the patient's normal complexes so it can differentiate abnormal beats. This "learning" process uses the 15 first valid beats (for example, free from noise) encountered during the learning phase.

While the system is learning the complex, the delayed arrhythmia wave displays the beat label "L". Also, the rhythm status message "LEARNING ECG" displays. Then the system determines the dominant rhythm. During this time the beats are labeled "N", and the rhythm status message changes to "LEARNING RHYTHM".

Learning

A learning phase involves the system learning the patient's dominant complexes. During a learning phase:

- Alarm timeout periods are cleared.
- Stored arrhythmia templates are cleared.
- Asystole, Vfib, and HR alarms (when there are enough beats to compute the HR) are active.
- All other alarms are not active.

Single Lead Analysis

If single lead analysis is selected, the arrhythmia system begins a learning whenever:

- ECG monitoring is initiated.
- The Relearn key is activated. See page 5-7.
- The ECG Lead or Lead Label is changed manually, or when Fallback occurs (see page 5-19).
- A Leads Off INOP condition (that has been active for >60 seconds) ends.

Multilead Analysis

If multilead analysis is selected, the arrhythmia system begins a learning on *both* leads whenever:

- ECG monitoring is initiated.
- The Relearn key is activated. See page 5-7.
- There has been a Leads Off INOP condition (that has been active for >60 seconds) for both leads, and the condition ends in either lead.

**Multilead
Analysis With
Changes in
One Lead**

Since the arrhythmia system uses more than one lead for analysis, if there is a change in one lead, the system does a relearn only on the affected lead. This happens whenever:

- An ECG lead or label is changed.
- A Leads Off INOP condition (that has been active for >60 seconds) ends.

Note—During this learning phase the system will continue monitoring using the operative lead. Therefore, the delayed arrhythmia wave is not labeled “L” and there is no “LEARNING ECG” rhythm status message. In addition:

- Alarm timeout periods are maintained.
- Stored arrhythmia templates are maintained for the operative lead.
- All alarms turned on are active.

**EASI ECG
Monitoring**

Whenever there is an INOP condition, the arrhythmia algorithm performs a Relearn, using the available lead.

Warning

Since Relearn happens automatically, if learning takes place during ventricular rhythm, the ectopics may be incorrectly learned as the normal QRS complex. This may result in missed detection of subsequent events of V-Tach and V-Fib. For this reason, you should:

- 1. Respond to the INOP message (for example, re-connect the electrode(s)).**
 - 2. Ensure that the arrhythmia algorithm is labeling beats correctly.**
-
-

Monitoring During Leads Off

Fallback

Multilead Analysis

If there is a Leads Off INOP in the primary lead for >10 seconds, the active secondary lead becomes the primary lead. This is known as lead fallback. In lead fallback, the arrhythmia system switches the leads on the display. When the Leads Off condition is corrected, the leads are switched back.

Singlelead Analysis

For single lead analysis, if there are two leads available, the other lead is made the primary lead (until the Leads Off condition is corrected).

EASI ECG Monitoring

If one of the derived EASI leads has an INOP condition (for example, LEADS OFF), a flat line is displayed. After ten seconds, the directly acquired EASI AI, AS, or ES lead (depending on which is available) is displayed with the label “ECG” and is analyzed by the arrhythmia system.

Note—If there is artifact in the ECG waves or a CANNOT ANALYZE ECG INOP condition, you can use the three EASI leads to troubleshoot.

1. Select **12-Lead ECG** on the Patient Window, then 3 EASI Leads.
2. The three directly acquired EASI leads will be displayed so that you can determine which electrodes are causing the problem and need to be replaced.

Extended Monitoring (Telemetry)



For telemetry-monitored patients, when both the primary and secondary leads have a Leads Off condition, if another lead is available it becomes the primary lead and the system does a relearn. This is called extended monitoring.

Extended monitoring applies if:

- Telemetry is configured for extended monitoring ON.
- The lead set provides more than two leads.
 - 5-wire lead set if using the Philips transmitter.
 - 4-wire lead set, if using the M1400A/B transmitter.

Status Messages

Overview

The Information Center displays two types of status messages in the Patient Window:

- Rhythm Messages -- to indicate the patient’s rhythm.
- Ectopic Status Messages -- to indicate the presence of ectopic beats (if present).

The Information Center updates these status messages every second.

Note—If you have basic arrhythmia capability configured, you will get only messages for the basic alarms (see “Levels of Arrhythmia Analysis” on page 5-3).

Rhythm Status Messages

Message	Description
ASYSTOLE	No QRS detected for x seconds. Choices of > 2.5 to 4 seconds <i>Note</i> —M3/M4 - No QRS detected for 4 consecutive seconds
VENT FIB/TACH	A fibrillatory wave (sinusoidal wave between 2-10 Hz) for 4 consecutive seconds
V-TACH	A dominant rhythm of adjacent Vs and a HR > the V-Tach Heart Rate Limit
SUST V-TACH	Ventricular Tachycardia rhythm for more than 15 seconds
VENT RHYTHM	A dominant rhythm of adjacent PVCs and a HR less than or equal to the V-Tach Heart Rate Limit
VENT BIGEMINY	A dominant rhythm of N, V, N, V (N=supraventricular beat, V=ventricular beat)

Message	Description
VENT TRIGEMINY	A dominant rhythm of N, N, V, N, N, V (N=supraventricular beat, V=ventricular beat)
PACED RHYTHM	A dominant rhythm of paced beats
IRREGULAR HR	Consistently irregular rhythm
SINUS BRADY* SINUS RHYTHM* SINUS TACHY*	A dominant rhythm of SV (supraventricular) beats preceded by P-waves
SV BRADY* SV RHYTHM* SV TACHY*	A dominant rhythm of SV (supraventricular) beats not preceded by P-waves
UNKNOWN RHYTHM	Rhythm cannot be determined
LEARNING ECG	Algorithm is learning the ECG beat morphology
LEARNING RHYTHM	Algorithm is learning the rhythm of the classified beats

* The Sinus and SV rhythm messages are updated based on the current heart rate, taking into account the patient category, adult, pediatric, or neonatal. In order to make a transition from one rhythm status to another (for example, from Sinus Rhythm to Sinus Brady) the HR must be in the new range for 5 beats.

The table below indicates the ranges for Sinus and SV rhythms.

Rhythm	Adult Range	Ped Range	Neo Range
Brady	15 to 60	15 to 80	15 to 90
Normal	60 to 100	80 to 160	90 to 180
Tachy	> 100	> 160	> 180

Ectopic Status Messages

Message (numeric definition is in brackets)	Explanation
(No message displayed)	No ectopic activity detected within the last minute
RUN PVCs [longest run in last minute]	More than 2 consecutive PVCs within the last minute
PAIR PVCs [number of pairs in last minute]	Pair PVCs within the last minute
PAUSE	No QRS detected for x seconds. Choices of >1.5 to 2.5 seconds. <i>Note</i> —M3/M4- No beat detected for 1.75 x average R-R interval for HR <120, or no beat for 1 second with HR >120 (non-paced patient only)
PACER NOT CAPT [number of pacer not captured episodes in last minute]	Pause with pace pulse (paced patient only) within the last minute
PACER NOT PACE [number of pauses with no pacer in last minute]	Pause without pace pulse (paced patient only) within the last minute
MISSED BEAT [number of pauses in last minute]	No beat detected for 1.75 x average R-R interval for HR <120, or no beat for 1 second with HR >120 (non-paced patient only) <i>Note</i> —M3/M4-this alarm is not available
R-ON-T PVCs	R-ON-T detected within the last minute
MULTIFORM PVCs [number of PVCs in last minute]	Multiform PVCs detected within the last minute

Message (numeric definition is in brackets)	Explanation
FREQUENT SVPBs [number of SVPBs in last minute]	SVPB count within last minute is greater than 5
SVPBs [number of SVPBs in last minute]	1-5 SVPBs in the last minute with a sinus rhythm and no Vs
SV BEATS [number of SVs in last minute]	SV (supraventricular) count within last minute (if 0 this message is blank) and rhythm status is PACED
PACED BEATS [number of paced beats in last minute]	Paced beat count within last minute (if 0 this message is blank) and rhythm status is not PACED

False Alarms

If you are getting false alarms perform the following steps:

Step	Action
1	<p>On the Patient Window select the Arrhythmia Analysis button. The Information Center displays up to two delayed Arrhythmia waves, with beat annotations.</p> <p><i>Note</i>—You can view all the leads that can be obtained from the patient’s ECG by selecting the Multilead ECG or 12-Lead ECG button. See “Ensuring Accurate Arrhythmia Monitoring” on page 5-6 for more information.</p>
2	<p>Check the delayed arrhythmia wave and beat labels to ensure that the algorithm is labeling the beats correctly. For patients with pacemakers, make sure the system is not counting pacer spikes as QRS complexes -- the beat label should not be above the pacer spike, detecting the pacer spike as a QRS.</p>

Step	Action
3	<p>If you don't agree with how beats are labeled select the Relearn button to cause the system to relearn the patient's ECG. See "Learning" on page 5-17 for additional information on learning.</p> <hr/> <p>Warning</p> <p>If you initiate learning during ventricular rhythm the ectopics may be incorrectly learned as the normal QRS complex. This may result in missed detection of subsequent events of V-Tach and V-Fib.</p> <hr/> <hr/>
4	If you still don't agree with how the system is labeling beats, change the ECG lead(s) to get better waves for arrhythmia analysis.
5	If it is difficult to provide more than one optimized ECG lead, consider changing to singlelead arrhythmia analysis. In singlelead analysis, the system uses only the primary lead. If you change to singlelead analysis, make sure that this optimized lead occupies the first ECG channel when you have more than 1 ECG lead displayed.
6	<p>For telemetry and bedsides other than the M3 or IntelliVue Patient Monitor, if changing the lead does not provide accurate analysis of the beats the minimum threshold for single QRS detection can be adjusted manually by:</p> <ol style="list-style-type: none"> 1. Selecting Manual in the QRS Detection box in the bottom of the window. 2. If using Multilead Analysis, choosing whether to display the primary or secondary lead from the Lead drop-down list. 3. Using the up and down arrows to move the horizontal cursor bars to the desired detection threshold. 4. Selecting the Update button to activate the measurement.

False Alarms

6

Patient Data Review

This chapter describes the Information Center’s patient data review windows. It includes the following sections:

- The Information Center Review Windows. 6-2
- Alarm Review. 6-8
- Trend Review 6-17
- Event Review 6-22
- Wave Review 6-30
- ST Review. 6-38
- 12-Lead Review 6-43
- Export Data to Holter System. 6-50
- Changing the Waves that are Stored. 6-53
- Scheduled Reports 6-54
- Information Center Web Access. 6-64

The Information Center Review Windows

Overview

Patient data storage begins when the patient is connected to a bedside monitor or telemetry device. The Information Center provides review windows that allow you to display a patient’s physiological parameters and alarm events that have been collected from a bedside monitor or telemetry device and stored over time in the database.

The review windows display the data in a variety of formats so that clinicians can use it to evaluate the patient’s status and make rapid diagnosis/prognosis, medication adjustments, and discharge/transfer decisions.

Note—If you have dual displays, the full screen is used when a data review application is open.

The Information Center review windows are accessible via the Trends or Alarm Review control buttons as well as the All Controls Window. They are:

Window	Description
Alarm Review	Displays the alarm events that have been automatically stored as well as strips that have been manually saved. See “Alarm Review” on page 6-8.
Wave Review	Displays stored waves. Wave Review allows you to examine the data for a significant episode in detail. See “Wave Review” on page 6-30.
Trend Review	Displays the parameter data in graphical format. Trend Review allows you to view data over time. See “Trend Review” on page 6-17.

Window	Description
Event Review	Displays the frequency and duration of events that have been configured for your unit. Event Review allows you to view events over time. You can navigate between significant episodes. See “Event Review” on page 6-22.
ST Review	Displays the patient’s ECG beats and ST segment values. ST Review allows you to examine the data for a significant episode in detail. See “ST Review” on page 6-38.
12-Lead Review	Displays a 10-second retrospective review of the 12 EASI derived ECG waves for EASI enabled bedside monitors and telemetry or the results of 12 Lead Captures performed at an IntelliVue Patient Monitor. See “12-Lead Review” on page 6-43.
Stored Wave	Allows you to change the waves stored for a patient. See “Changing the Waves that are Stored” on page 6-53.

**Review
Window
Features**

The Information Center review windows provide the following.

Feature	Description
Reporting	You can print a report from the review window by selecting the Print button on the top of the window.
Easy Navigation Between Windows	<p>The related application buttons on the bottom of the review windows enable easy navigation between review windows.</p> <p><i>Note</i>—If you enter a review window directly from the Patient Window, the current time frame and current values are displayed. If you enter a review window from a related review window, the cursor time position for that patient is the same as it was on the previous review window.</p>
Time Focus	<p>The review windows allow you to display data for a specific period of time. For Alarm Review you can change the time focus by placing your cursor over the time duration displayed at the bottom right of the screen and selecting from the pop-up list. Use this feature to display data over a longer period of time (with less detail) or a shorter period of time (with more detail).</p> <p><i>Note</i>—A '?' mark will display on the timeline in any of the review windows whenever the time on the Information Center or SDN bedside monitor is changed, for example, with daylight savings time. This a normal event. A question mark will also display when the Information Center clock and the SDN bedside monitor clock sync or re-sync. Clocks tend to drift, when this happens the clock adjusts the time forward or backward by 1 minute. The expected frequency of the time clock synchronization is about 1 per 48 hours.</p>

Feature	Description
Cursor/Page Arrows	You can also change the time focus in review windows by “paging” backward and forward. The double arrows page back/forward by a larger amount than the single arrow. For example, if 8 hours of data are shown on the screen, the double arrows move back/forward by 8-hour increments, while the single arrows move back/forward by smaller increments.
Data Updating	Review windows update the data when you navigate forward in time or leave the window and come back to it.

Using Strips in Review Windows

Strip windows in the review applications (except for Trend Review, ST Review and 12-Lead Review) enable the clinician to view details. Strips display about 10 seconds of data. Event Review displays a strip permanently, while the other review applications enable you to produce one or more strips that overlay a part of the window.

When you display a strip, all other buttons in the window remain active. The table below describes how to use the strip windows to display details.

If you want to...	Do this...
Move back/forward in time	Use the single arrows to move the time back/forward by approximately one second. Use the double arrows to move back/forward by a “page”.
Change the wave size (scale)	Put the cursor over the cal bar and use the arrows to choose the size you want.

If you want to...	Do this...
Save the strip in Alarm Review (not applicable for Alarm Review)	Select the Save button. A box will appear that allows you to enter a comment. This comment will then be visible when the strip is displayed in Alarm Review. If the strip is included in an alarm report, the comment will be printed in the report.
Use the electronic caliper in strips to measure intervals, such as R-to-R	<p>To Make a Measurement</p> <ol style="list-style-type: none"> 1. Select the strip once to fix the first point of the caliper to the strip. 2. Drag the cursor and release to fix the second point and display the measurement. <p>To Adjust Measurements</p> <p>Horizontally:</p> <ul style="list-style-type: none"> • Place the cursor on or, for touch screen displays touch the right or left vertical line. A right/left arrow appears. Select this arrow and drag the line to the desired position. <p>Vertically (for example, to move the measurement away from the waveform):</p> <ul style="list-style-type: none"> • Place the cursor or, for touch screen displays touch between the vertical lines. Click or touch above or below the measurement. <p>The measurement is removed when another action is taken in the strip window. Therefore, to print the strip with the measurement, first make the measurement, then print the strip.</p>
Print a 30 second strip report of a single strip (from Alarm Review, Wave Review, or Event Review)	Select the Print button to the right of the strip.

If you want to...	Do this...
Make a recording of the strip	<p>If a 4-channel recorder is available on your system, indicate whether to send the recording to the 2 Channel or 4 Channel recorder by selecting the appropriate radio button then select Record. You will get a recording with 30 seconds of stored waveform.</p> <p><i>Note</i>—If a 4-channel recorder is not available on your system the 2-channel and 4-channel radio buttons do not display in this window.</p>
Clear the strip from the screen (not applicable for Event Review)	Select the Close button.

Alarm Review

Overview

The Alarm Review Window allows you to view stored alarms and saved strips. The records are divided as follows:

- 50 records -- 40 stored alarms and 10 saved strips.
- 150 records -- 120 stored alarms and 30 saved strips.

Stored Alarms

Stored alarms are configured alarms that are automatically added to alarm history when the alarm is generated. Each stored alarm has:

- The date and time of the alarm.
- The alarm text.
- Vital signs associated with the alarm strip.
- A 30-second compressed wave, with 10 seconds pre-event, and 20 seconds post-event.

When the number of stored alarms reaches maximum capacity, the oldest alarm strip (#40 or #120) is automatically discarded and the new alarm is saved as #1.

Note—If an alarm has occurred and the monitoring device was turned off prior to the storage of the alarm, the data for that alarm cannot be retrieved.

Saved Strips

Saved strips are waves that you manually save from the Wave Review, Event Review Window, or from the patient sector. You can view saved strips in a separate group (USER SAVED STRIPS). The most recent strip is displayed first. Each saved strip has:

- The time and date.
- A 30-second compressed wave. Strips saved from Wave Review or Event Review have 15 seconds before/after the center of the strip as it was in the review window. Strips saved from the patient sector have 10 seconds before the save action was taken and 20 seconds after.

When the number of saved strips reaches maximum capacity, the oldest saved strip (#10 or #30) is automatically discarded and the new strip is saved.

Managing Alarms/Strips

You can manage alarms/strips by:

- Deleting alarms/strips manually. See page 6-11.
- Inhibiting the automatic storage of individual alarms on a per patient basis via the Record/Store/Page Alarms window. This feature is configurable. See “Recording/Storing Alarms” on page 4-39.

Using Alarm Review

The table below describes how to use the Alarm Review Window.

If you want to...	Do this...
Select the alarm(s) or saved strip(s) for viewing	Select a specific type or all alarms or saved strips for viewing by selecting a group at the top right of the window.
Change the timeline duration	Select the down arrow next to the Time Duration box at the bottom right of the window and select a time from the drop-down list that displays. Choices are 12 hours, 24 hours, 48 hours or All Available.
View the alarm(s) in a tabular display.	Select the Tabular Display checkbox. A check mark in the box causes a single alarm strip to display along with a list of alarms on the bottom of the window. You can select another alarm strip to display by selecting the alarm from the alarm list on the bottom of the window, by selecting the Next or Previous buttons.
Display an alarm that occurred at a specific time	Click on or, for touch screen displays, touch the time line or you can use the arrow buttons. The double arrows go back/forward by a page (5 or 10 alarms). The single arrows go back/forward by one alarm.

If you want to...	Do this...
View uncompressed waves for an alarm or saved strip	<p>Click on or, for touch screen displays, touch the the alarm then select the Strip Window button. The strip displays, with up to 4 waves for viewing and printing in an uncompressed format for the alarm. Use the arrow keys to scroll backward and forward.</p> <p>In half-screen windows, you can display one strip. In full-screen windows you can display two strips.</p>
Re-label the alarm	<ol style="list-style-type: none"> 1. From the alarm strip, place your cursor on the alarm type at the top of the screen. A popup list is displayed. 2. Choose an alarm type by selecting a type in the list. For example, you may want to relabel an alarm from IRREGULAR HR to ATRIAL FIB. (The current label is the last label in the list.) <p>When you re-label an alarm the alarm is marked with “Re-labeled to [new label]” for identification. Re-labeling an alarm has no effect on future alarm calls. The alarm label is just changed on the strip and in Alarm Review.</p>
Make a recording of the alarm	<p>If a 4-channel recorder is available on your system, indicate whether to send the recording to the 2 Channel or 4 Channel recorder by selecting the appropriate radio button then select Record. You will get a recording with 30 seconds of stored waveform.</p> <p><i>Note</i>—If a 4-channel recorder is not available on your system the 2-channel and 4-channel radio buttons do not display in this window.</p>

If you want to...	Do this...
Delete alarms	<p>You can delete an alarm from within the Alarm Review Window, from within an alarm strip or from the tabular display.</p> <p>Alarm Review Window To delete alarms from Alarm Review:</p> <ol style="list-style-type: none"> 1. Mark the alarm(s) for deletion by clicking on or, for touch screen displays, touching the alarm then selecting the Delete Alarm button. When you select the Delete Alarm button a wastebasket icon appears on the right side of the alarm. <i>Note</i>—You can cancel the deletion of an alarm by selecting the Delete Alarm button again. 2. Delete the alarms (no undoing), by selecting the Delete Alarms button. <p>Alarm Strip To delete alarms from the Alarm Strip select the Delete button on a strip then select the Close button. The strip and alarm will be deleted. (You cannot undo the delete in this case.)</p> <p>Tabular Display To delete alarms from a tabular display:</p> <ol style="list-style-type: none"> 1. Mark the alarm(s) for deletion by right mouse clicking on the alarm in the alarm list then selecting Delete from the pop-up list that displays. When you select Delete the word “Delete” displays on the right side of the alarm. Right mouse click functionality is not available on a touch screen display. <i>Note</i>—You can cancel the deletion of an alarm by right mouse clicking on the alarm and selecting Delete again. 2. Delete the alarms (no undoing) by clicking the Delete Alarms button.

If you want to...	Do this...
Print a report	<p>You can print a report from within the Alarm Review Window, from a strip or from within a tabular display.</p> <p>Alarm Review Window</p> <p>To print from the Alarm Review Window:</p> <ol style="list-style-type: none">1. Select the alarm(s) clicking on or, for touch screen display, touching the alarm then selecting the Print button. When you select this button a printer icon appears on the right side of the alarm. <p><i>Note</i>—You can select a maximum of 12 alarms to be printed at one time. To print more than 12 alarms, select the first 12 and print; then select the next 12 and print.</p> <ol style="list-style-type: none">2. Select Print at the top right of the window. <p>You get a report of the selected alarms, with primary and secondary 25 mm/s waves. There are four alarms per page; each shows approximately the first 10 seconds of the 30-second strip (8 seconds pre-event, and 2 seconds post-event).</p> <p>Alarm Strip</p> <p>To print a report of the displayed alarm strip, select the Print button to the right of the strip. You will get a report of the strip just as it appears on the screen, for example, with the size you chose and with caliper measurements if you used them.</p>

If you want to...	Do this...
	<p>Tabular Display</p> <p>To print a report from a tabular display:</p> <ol style="list-style-type: none"><li>1. Right mouse click on the alarm in the alarm list then select Print from the pop-up list. The word Print displays to the right of the alarm marking the alarm for inclusion in the report.<li>2. Select any additional alarms by repeating Step 1.<li>3. Print a report of the selected alarms by selecting the Print button on the top of the window. <p>The report will contain up to four strips per page, with the oldest strip first. Each strip will have up to four waves.</p> <p><i>Note</i>—Right mouse click functionality is not available on touch screen displays.</p>

If you want to...	Do this...
Use the electronic caliper	<p>To Make Multiple Measurements and Save as Comment on Alarm Strip</p> <p>You can make multiple measurements and save them as a comment on the strip.</p> <ol style="list-style-type: none"> 1. Select the checkbox to the left of the E-Caliper field. Caliper Measurements is selected when a checkmark displays. 2. Make the first measurement (see “Using Strips in Review Windows” on page 6-5 for instructions). 3. Assign a label to the measurement by selecting a measurement from the Caliper Measurements list. Choices are: PR, QRS, QT, RR and QTC. 4. The measurement displays in the Comment field for this strip. 5. Continue until all desired measurements are made. <p><i>Note</i>—The QTC measurement is automatically calculated from the QT and RR intervals.</p>
Change the wave size	Click on or, for touch screen displays, touch the cal bar then select the size of the wave you want.
Change the wave speed	From the alarm strip, change the speed to 6.25 mm/s, 12.5 mm/s, 25 mm/s, or 50 mm/s by selecting the speed from the Speed drop-down list on the bottom of the window. When you select a different speed the window re-displays with the selected speed.
Add comments	From the alarm strip, enter text in the Comment field on the upper left side of the window then select the Close button. The comments you enter are tied to the strip and will appear on the strip in Alarm Review and in the Alarm Reports.

The following alarm types are available from the pop-up list:

SINUS RHYTHM	SV TACHY	IDIOVENTRICULAR
SINUS BRADY	JUNCTIONAL RHYTHM	(AVR)ACCEL IDIOVENT
SINUS TACHY	1° AV BLOCK	V-TACH
SINUS PAUSE/ARREST	2° AV BLOCK TYPE I	V-FIB
ABBERENT PAC	2° AV BLOCK TYPE II	ATRIAL PACED
ATRIAL TACHY	3° AV BLOCK	AV PACED
ATRIAL FLUTTER	BUNDLE BRANCH BLOCK	VENT PACED
ATRIAL FIB	LBBB	PAC
WIDE QRS SVT	RBBB	ABERRANT SVT

Fast Alarm Review

Fast Alarm Review enables the clinician to quickly silence and view the alarm wave and take immediate action on the alarm. This capability is configurable for all red and yellow alarms, all red alarms only, or is disabled (default).

If enabled, selecting the **Silence/Review** button for an active alarm silences the alarm and opens a Patient Window with the strip for that alarm. (Clicking or, for touch screen displays, touching anywhere in the sector, except on a button, silences the alarm without displaying the strip.)

Note—If there is an application window open for any patient, when the **Silence/Review** button is selected, the Fast Alarm Review strip overlays it.

The alarm strip contains 15 seconds of unannotated waves that proceeded the alarm. About 10 seconds are displayed on the screen; arrows enable viewing of the other 5 seconds. The strip can have up to four waves (the first four waves that are available in the Patient Window).

When Fast Alarm Review is open, the following buttons are available:

Button	Action
Close ¹	Dismisses Fast Alarm Review and shows the window that was originally open, or if none open, shows the Main Screen.

Button	Action
Delete	Deletes the alarm (it will not be stored) and closes the window.
Record	Produces a 15-second recording of the alarm.
Print	Prints the Fast Alarm Review screen.
Page	If paging is available on your system, sends a page to the paging device(s) currently assigned to this bed.
Patient Window¹	Removes Fast Alarm Review and displays the Patient Window <i>for that patient</i> . (This changes the focus from the previously displayed bed.)
Main Screen¹	Closes all open windows and returns to the Main Screen. <i>Note</i> —All navigation controls in applications are set to defaults.

¹When the button is selected, if the alarm was set up to be stored in Alarm Review, it will be stored.

As in the Wave Review and Event Review, when the strip is displayed, you can make a single caliper measurement and display different waves. If you then print the alarm strip, the printout will contain the waves and measurements that are on the screen.

Note—Recording from Fast Alarm Review is independent of the recording settings in the Record/Store/Page Alarms window. For example, you can inhibit the recording of a type of alarm in the Record/Store/Page Alarms window, and then record the alarm on an individual basis from Fast Alarm Review. Storage of alarms is controlled by the Record/Store/Page Alarms window — alarms cannot be stored from Fast Alarm Review.

Trend Review

Overview

The Trend Review window allows you to see a patient's averaged physiological parameters collected over time from a bedside monitor or telemetry device in either graphic or tabular format. Trend data is available for up to the last 24 hours (48 hours if option purchased). All parameters that are stored can also be trended.

Note—The only arrhythmia trends available for M3 monitors are HR and PVC rate.

Note—The Information Center uses only centigrade as the unit measure for temperature. For IntelliVue Patient Monitors if your bedside is set up to use fahrenheit as the unit measure the Information Center Trend Review window will display the fahrenheit numeric but label it as centigrade. Bedsides connected to the Information Center should always set temperature configuration to centigrade. Refer to your bedside documentation for information on configuring temperature.

Trend Review with Graphic Display

The Trend Review window with graphic display organizes the trends into trend groups that allow quick access to 'typical' trends. Each group can contain up to five trend graphs. Each trend graph can have up to two parameters. One trend has the left axis, and the other has the right axis. The data (parameter name, unit, trend plot, scales and values) for each parameter is in a separate color.

In half-screen operation, you can display up to two trend graphs in a group at one time. You can cycle through the other graphs. In full-screen operation, all five trend graphs are presented at one time.

There are several different trend presentations, depending on the characteristics of the parameter. Different types of trends can be mixed in a trend graph. The table below describes how the Information Center displays different parameters.

Parameter	Display
Continuous	The Information Center displays single-value continuously monitored parameters, such as heart rate with a single line plot and triple-value periodic parameters, such as invasive blood pressure with three lines of the same color.
Aperiodic	<p>The presentation of aperiodic, non-continuous, parameters depends on the number of values to be shown. Aperiodic parameters are presented as discrete graphic data points with an 'X' indicator. Triple-value aperiodic parameters (for example, NBP) appear as an 'X' at the mean value with arrow indicators at the systolic and diastolic values. Aperiodic parameters are not averaged and are always displayed as exact values. If more than one aperiodic value falls into the same column, the latest value is shown.</p> <p>Counts (for example, PVC Count, Normal Beat Count, etcetera.) and % arrhythmia measurements (% Bigeminy, % Paced, etcetera) are displayed in bar chart form/histogram.</p> <p>Rates (Paced Rate, S-S Rate, V-V Rate, etcetera) are displayed in graphic form as two trend lines.</p>
Multiple	Multiple parameters, such as ST, are presented as separate curves, each in a different color. The same colors are used to display the parameter names and corresponding values.
Histograms	Discrete events, such as PVC count, are presented as histograms.

The table below describes how to use the Trend Review with graphic display.

If you want to...	Do this...
Change the trend group displayed in the Trend Review window	With a check in the Trend Groups checkbox, select a group from the Trend Group drop-down list. The trend graphs are grouped into sets of up to five each. Each trend graph can have up to two parameters.
Select a different trend graph parameter to display	With a check in the Trend Groups checkbox, select the parameter from the Parameter drop-down list. The parameters that are available depend upon the selected trend group.
Remove the current graph trend and replace parameters you select	Uncheck the Trend Groups checkbox then select the parameters from the parameter drop-down list.
See parameter values for a point in a trend for example, where the trend line shows a change in the patient's status	Move the Navigator cursor bar by using the arrows or by clicking on or, for touch screen displays, touching the trend graph.
Change the trend scale	Click on or, for touch screen displays, touch the axis then select a different scale from the pop-up list that displays. Selecting Optimum ensures that to all parameter data within the current duration is visible.
Change the time period for a trend	Select the number of hours from the Time drop-down list. Choices are 1, 4, 8, 12, and 24 hours.
Print a report	Select the Print button on the top right of the window.

Trend
Review with
Tabular
Display

The Trend Review window with Tabular Display displays parameter data in rows and columns suitable for charting purposes. You select tabular display by selecting the **Tabular Display** checkbox. A checkmark in the checkbox removes the bottom trend graph and displays a table on the bottom of the Trend Review window. The table includes:

- Up to 140 rows of averaged data points for the specified parameters.
- Up to 17 columns of time indicators spaced per the selected time resolution.
- Parameter label for each displayed parameter is always in black.
- A highlighted column corresponding to the nearest minute for the current time focus. In addition a shaded gray rectangle appears in the trend graph area corresponding to the number of minutes of tabular data being displayed and the duration of the timeline.

Note—For most parameters the value displayed in the tabular trend is the **median** value selected from five 12-second samples (valid data only). For triple-valued pressure parameters, the median of the mean pressure is determined and the corresponding systolic and diastolic values are used for the tabular trend values. For ST parameters, the value displayed is the value corresponding to the maximum absolute value over the interval. For P, S, and V rates, the minimum and maximum within the interval is displayed.

The table below describes how to use the Trend Review with tabular display

If you want to...	Do this...
Expand the number of rows displayed in the table	Select the up arrow to the left of the table. When you select the up arrow the graphic display on the top of the window is removed and the number of tabular rows displayed increases.
Move the tabular display backward or forward in time	Use the horizontal scroll bar on the bottom or use the right and left arrow buttons.
Change the time period	Select a time interval from the Timeline Duration drop-down lists to the right of the table.

If you want to...	Do this...
Change the time resolution for the tabular trends	Select a different number of minutes from the Time Resolution drop-down list. The number of minutes available depend on the hour selected in the Timeline Duration.
Add a parameter to the tabular table	Select a parameter from the Parameter list to the right of the table.

Event Review

Overview

The Event Review Window provides an overview of the frequency and duration of specific events (for example, V-Tach), along with a strip showing the waves for the event. The strip area is at the top of the window; the event occurrence area, with up to five event bars is at the bottom.

Up to ten event groups can be configured in Unit Settings for a Information Center. All groups are available for selection. Event Review groups the events into sets of up to five events. Events include:

- Alarms generated from the Information Center or bedside.
- Arrhythmia events for example, R-on-T.

Note—The events that are available are dependent on your monitoring device.

Cursor/Event Information

The Event Review Window provides the following information whenever the event cursor matches the onset of an event:

- The time and date corresponding to the position of the event cursor.
- The name of the event, the duration of the event (if applicable) and the actual value and name of the parameter (if applicable) that violated the event limit.
- The event count to the right of each event bar reads “X/Y”, where (X) is the number of events at and to the left of the event cursor and (Y) is the total number of such events on the screen. For example, 3/5 tells you that there are a total of 5 events in that row, and 3 of the events occurred before or at the time of the cursor bar.

Event Bars

The Event Review Window provides event bars to show the duration from the detection of the event to when the event was acknowledged (silenced).

Event bars are color coded to represent the severity of the event. The color of the event indicates the severity.

Color	Severity
Red	*** Life threatening alarms.
Yellow	** Limit violation alarms.
Cyan	All INOP conditions and non-alarming events including arrhythmia events.
Blue	User saved strips.

Note—Gray stripes indicate that the analysis of a specific event was not reliable for a certain period of time (for example, if the signal was not available or of insufficient quality).

Using Event Review

The table below describes how to use the Event Review Window.

If you want to...	Do this...
Select specific events	<p>When you enter the Event Review Window from Main Screen, the event cursor is positioned at the time of the most recently collected data. To select specific events:</p> <ul style="list-style-type: none">• Click or, for touch screen displays, touch the left and right cursor arrows. Each time you click or touch the cursor arrow, the cursor jumps to the onset of the next (or previous) event.• Click on or, for touch screen displays, touch the event navigator to display a strip corresponding to the event at that time.• Toggle specific event types on and off by clicking on or, for touch screen displays, touching the event label to the left of the event bar. When event label is off (greyed-out) the event navigator left and right cursor arrows ignore all of these types of events <p><i>Note</i>—The displayed strip corresponds to the location of the event cursor. The strip automatically updates when you move the event cursor. You can also scroll the strip (and the event cursor moves correspondingly).</p>
Save a strip and add a comment	<p>You can save a strip in Alarm Review by selecting Save. A box will appear that allows you to enter a comment. This comment is associated with the time shown on the strip, and does not display when you scroll the strip window. However, the comment is visible from the Alarm Review Window.</p>

If you want to...	Do this...
Change the strip wave size	Click on or, for touch screen displays, touch the cal bar then select the size of the wave you want.
Change the strip wave speed	Change the speed to 6.25 mm/s, 12.5 mm/s, 25 mm/s, or 50 mm/s by selecting the speed from the Speed drop-down list on the bottom of the strip window. When you select a different speed the window re-displays with the selected speed.
Change the event timeline duration	Select the number of hours from the Time drop-down list. Choices are 1, 4, 8, 12, and 24.

If you want to...	Do this...
Make a recording of the strip	<p>If a 4-channel recorder is available on your system, indicate whether to send the recording to the 2 Channel or 4 Channel recorder by selecting the appropriate radio button then select Record. You will get a recording with 30 seconds of stored waveform.</p> <p><i>Note</i>—If a 4-channel recorder is not available on your system the 2-channel and 4-channel radio buttons do not display in this window.</p>
Use the electronic caliper	<ol style="list-style-type: none">1. With the strip displayed, select the checkbox to the left of the E-Caliper field. Caliper Measurements is selected when a checkmark displays.2. Make the first measurement (see “Using Strips in Review Windows” on page 6-5 for instructions).3. Assign a label to the measurement by selecting a measurement from the Caliper Measurements list. Choices are: PR, QRS, QT, RR and QTC.4. The measurement displays in the Comment field for this strip.5. Continue until all desired measurements are made. <p><i>Note</i>—The QTC measurement is automatically calculated from the QT and RR intervals. The QTC label is greyed-out until after the QT and RR measurements are made. You must select the QTC label for it to appear on the strip.</p>

Reports

From Event Review, you can print four types of reports:

- 30 second strip report -- you can print a report of a single strip by selecting the **Print** button to the right of the strip.
- Event Review Window report -- you can print a report of the Event Review window by selecting the **Print** button on the top right of the window. The Information Center prints a report of the waves you are viewing along with the event bars on the bottom. The Event Review Window uses this format for both half screen and full screen operation.
- Strip Report -- you can create a report based on selected strips. See “Strip Reports” below.
- Event Summary Report-- you can print a report based on selected events. See “Event Summary Report” below.

Strip Reports

To print a Strip Report, perform the following steps:

Step	Action
1	Display the first strip.
2	Select the Strip Report checkbox.
3	In the small window that displays, enter a comment or select a pre-set comment.
4	Select Save User Strip if you want to save this strip in Alarm Review. <i>Note</i> —Selecting the strips for this report does not save the strips.
5	Select OK -- the Report List will be displayed.
6	Click on or, for touch screen displays, touch the next wave area of interest then select Add .
7	Repeat Steps 3 through 5 for each wave area of interest.

Step	Action
8	You can make changes to any strip (for example, add a caliper measurement) by selecting the strip from the Report List, making the changes then selecting Add .
9	To print the report, select Print . <i>Note</i> —If you want to remove a strip before printing the report, highlight that strip, then select Remove.

The report will contain all of the selected strips sorted by time. The strips will also appear on the report just as they did on the screen (with caliper measurements, at the same speed, with the same waves, etc.). Once you print the report, the list is cleared.

**Event
Summary
Report**

For dual-display systems, to print a Event Summary Report, perform the following steps:

Step	Action
1	Select the Summary Report button.
2	Select the events to be included in the report by clicking on or, for touch screen displays, touching the event in the event bar then selecting the Add button. Repeat for each event to be included in the report. A table with the selected events displays on the bottom of the window. You can remove a previously selected event from the event table by clicking on or, for touch screen displays, touching the event in the table then selecting the Remove button. <i>Note</i> —Selecting an event in the event table displays the event in a strip window. Clicking in or, for touch screen displays, touching an area on the event bar that has no events then selecting the Add button causes a strip window to display for the selected time. The event is added to the Summary Report table as a blue event and labeled as “User Defined Event”
3	Select Print . You will get a report of all of the selected events.

The Event Summary Report contains:

- A graphic trend of HR for the most recent 24 hours.
- A graphic trend of PVC for the most recent 24 hours.
- A tabular trend for HR (max, median, min) for the most recent 24 hours.
- A tabular trend of event counts for each of the event group entries for the displayed event group for the most recent 24 hours.
- An event strip containing the event specification and duration for each entry in the Summary Report.

Wave Review

Overview

The Wave Review Window allows you to view up to four continuous waves that have been stored for a patient. Wave Review Window includes:

- A lead label for each displayed wave.
- Navigator selections for Event, Trend or Timeline.
- A red rectangle in the wave area indicating the corresponding wave strip selection.
- A square-wave pattern for any wave that is invalid or not accessible for the given time period (see “No Data/Invalid Data” on page 6-32)
- A label change indicator if the stored wave changed for the specified time period.
- A scale change indicator if the wave changed scaled during the specified time period.

Note—The Stored Wave Window, accessible from the All Controls Window allows you to select the waves for storage for a patient.

Navigation Choices

The Wave Review Window contains two components: the actual full disclosure waves in the top part and navigation in the bottom part.

You can use the navigation area to select a focus for the waves. The choices are:

- **Trends**
Use the Trend navigator to display a single trend graph and scan the trend for significant changes. The choices available to you in the Trend Navigator depend on whether or not you have Trend Groups selected in the Trend Review window (see “Trend Review” on page 6-17). With Trend Groups selected in Trend Review window you can select the trend group you would like to see. With Trend Groups not selected in the Trend Review window, you can select parameters to trend by selecting from the **Parameter** drop-down lists. Use the top Parameter drop-down list to change the left parameter. Use the bottom Parameter drop-down list to change the right parameter. Moving the cursor by clicking on or, for touch screen displays, touching the trend area displays the waves for that time period.

- **Trend Table**

The Wave Review window with the Trend Table navigator displays parameter data in rows and columns suitable for charting purposes. When you select Trend Table as the navigator a table displays on the bottom of the Wave Review window. The table includes:

- Up to 140 rows of averaged data points for the specified parameters.
- Up to 17 columns of time indicators spaced per the selected time resolution.
- Parameter label for each displayed parameter is always in black.
- A highlighted column corresponding to the nearest minute for the current time focus. In addition a shaded gray rectangle appears in the trend graph area corresponding to the number of minutes of tabular data being displayed and the duration of the timeline.

- **Events**

Use the Events navigator to look at waves for events of interest. The Event navigator has bars for each event code. The event bars have different colors depending on level of severity:

- Red = life-threatening alarms
- Yellow = limit violation alarms
- Cyan = all INOP conditions and non-alarming events including arrhythmia events

Moving the cursor by clicking in or, for touch screen displays, touching the event area displays the waves for that event. To change the Event Group, select a different group from the **Event Group** drop-down list.

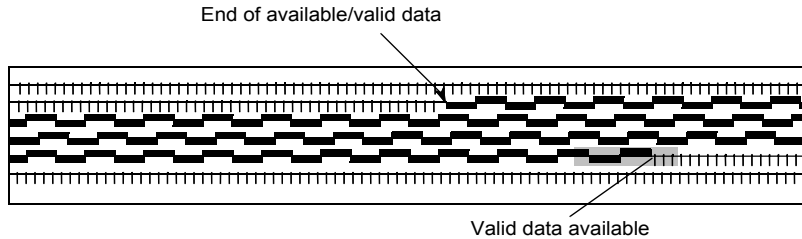
- **Timeline**

You can use the Timeline at the bottom of the window to navigate. The timeline indicates the time and date (indicated on the first time stamp or when the day boundary is crossed). The timeline has 3-6 ticks depending on the current time period selected. A shaded area with a vertical bar with arrows in the timeline corresponds to the currently displayed waves. This shaded area depends on the number of minutes of wave being displayed and the duration of the timeline.

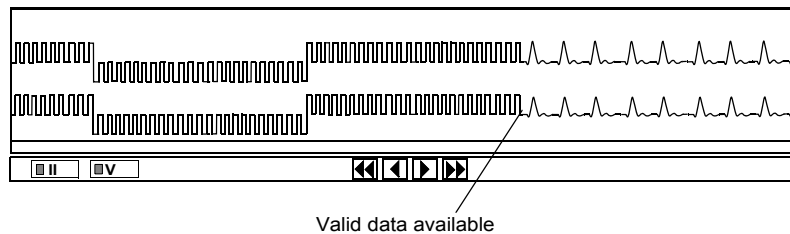
No Data/ Invalid Data

If the data is unavailable (for example monitoring is suspended) or invalid (for example, an INOP condition), a black or green square wave is displayed.

If you get a strip and there is no valid data available, the message “No Data From Bed” is displayed in the strip. (This may result from turning off the monitoring device or placing it in standby.)



However, if there is any valid data available in the previous/next minute, a square wave is displayed in the strip. Scroll back/forward to get to the wave data.



Using Wave Review

The table below describes how to use the Wave Review Window.

If you want to...	Do this...
View waves for an event	<p>To see waves for an event of interest (for example, an episode of VTACH), move the Navigator cursor bar by using the arrows or clicking on or, for touch screen displays, touching the event line.</p> <p>To view all waves or waves in combination with trends place the cursor over Navigator and select on your choice.</p>
Display/hide waves for selected wave label	Select the respective wave label on the right of the window.
Change the displayed waves size	Use the Up and down arrows to the right of the waves. When you use the Up and Down arrows the Information Center redraws all the displayed waves, changing the wave size up or down.
View the waves greater/less detail	Change the amount of detail shown by clicking on or, for touch screen displays touching the Wave Duration field on the top right of the window then selecting the number of minutes from the drop-down list. The larger the number of minutes the less detail shown. Choices are 1 minute, 6 minutes, 12 minutes, 30 minutes and 60 minutes.
Change the timeline duration	Select the number of hours from the Time drop-down list on the bottom left of the window. Choices are 1, 4, 8, 12, and 24.

If you want to...	Do this...
Get a strip to view waves in greater detail	<p>Move the cursor to the part of the wave you want and click or, for touch screen displays, touch the part of the wave you want. A strip window displays.</p> <p>In half screen operation most of the wave window will be replaced by the strip window.</p> <p>Full screen operation: the strip window will cover part of the waves. The strip can have up to four waves.</p>
Make a recording of the wave strip	<p>If a 4-channel recorder is available on your system, indicate whether to send the recording to the 2 Channel or 4 Channel recorder by selecting the appropriate radio button then select Record. You will get a recording with 30 seconds of stored waveform.</p> <p><i>Note</i>—If a 4-channel recorder is not available on your system the 2-channel and 4-channel radio buttons do not display in this window.</p>
Save a strip and add a comment	<p>You can save a strip from Wave Review by selecting the Save button. A box will appear that allows you to enter a comment. This comment is associated with the time shown on the strip, and does not display when you scroll the strip window. However, the comment is visible from the Alarm Review Window if you display that strip.</p>
Change the strip wave size	<p>Click on or, for touch screen displays, touch the cal bar then select the size of the wave you want.</p>

If you want to...	Do this...
Change the strip wave speed	Change the speed of the strip wave to 6.25 mm/s, 12.5 mm/s, 25 mm/s, or 50 mm/s by selecting the speed from the Speed drop-down list on the bottom of the strip window. When you select a different speed the window re-displays with the selected speed.
Use the electronic caliper	<ol style="list-style-type: none"> 1. With the strip displayed, select the checkbox to the left of the E-Caliper field. Caliper Measurements is selected when a checkmark displays. 2. Make the first measurement (see “Using Strips in Review Windows” on page 6-5 for instructions). 3. Assign a label to the measurement by selecting a measurement from the Caliper Measurements list. Choices are: PR, QRS, QT, RR and QTC. 4. The measurement displays in the Comment field for this strip. 5. Continue until all desired measurements are made. <p><i>Note</i>—The QTC measurement is automatically calculated from the QT and RR intervals. The QTC label is greyed-out until after the QT and RR measurements are made. You must select the QTC label for it to appear on the strip.</p>

Reports

From Wave Review, you can print four types of reports:

- 30 second strip report -- you can print a report of a single strip by selecting the **Print** button to the right of the strip.
- Wave Review Window report -- you can print a report of the Wave Review window by selecting the **Print** button on the top right of the window.
- Strip Report -- you can create a report based on selected strips (for example, when doing a Swan insertion).
- Duration Report -- you can print a report or make a recording of waves for a specific length of time. See “Duration Report” below.

Strip Reports

To print a Strip Report of multiple strips, perform the following steps:

Step	Action
1	Display the first strip.
2	Select the Strip Report checkbox.
3	In the small window that displays, enter a comment or select a pre-set comment.
4	Select Save User Strip if you want to save this strip in Alarm Review. <i>Note</i> —Selecting the strips for this report does not save the strips.
5	Select OK -- the Report List will be displayed.
6	Click on or, for touch screen displays, touch the next wave area of interest then select Add .
7	Repeat Steps 3 through 5 for each wave area of interest.

Step	Action
8	You can make changes to any strip (for example, add a caliper measurement) by selecting on the strip in the Report List. Make the changes, and then select Add .
9	To print the report, select Print . <i>Note</i> —If you want to remove a strip before printing the report, highlight that strip, then select Remove.

The report will contain all of the selected strips sorted by time. The strips will also appear on the report just as they did on the screen (with caliper measurements, at the same speed, with the same waves, etc.). Once you print the report, the list is cleared.

Duration Reports

To print or record a Duration Report, perform the following steps:

Step	Action
1	Specify where you want the report to begin by right clicking on the area of the wave then selecting Start from the pop-up menu that displays (a marker will display on the wave indicating the desired Start time). <i>Note</i> —Right mouse click functionality is not available with a touch screen display.
2	Specify where you want the report to end by right mouse clicking on that area of the wave then selecting Stop from the pop-up menu that displays (a marker will display on the wave indicating the desired stop time).
3	For recordings, if a 4 channel recorder is available on your system, indicate whether to print the recording on the 2 Channel or 4 Channel recorder by right mouse clicking on the wave then selecting the appropriate recorder from the pop-up list that displays.

Step	Action
4	To print a recording of the specified wave duration, right mouse click in the wave then select Record from the pop-up list.
5	To print a report of the specified wave duration, right mouse click in the wave then select Print from the pop-up list.

ST Review

Overview

The ST Review displays up to 12 ST “snippets” (a sample of the patient's ECG beats for a given time) and ST elevation/depression values, in combination with trends or events. ST Review allows you to examine the data for a significant episode in detail. You can view individual ST snippets, compare snippets against each other or against a selected baseline.

The ST values are displayed and trended at the Information Center.

For bedside monitored patients adjust measurement points and alarm limits at the bedside. Bedside monitored patients need to turn ST on to make data available in the ST Review window (see “Enabling ST Review for Bedside Monitors” on page 8-5).

For telemetry monitored patients adjust measurement points and alarm limits on the Information Center.

The bottom portion of the window provides navigation based on Trends or Events for all monitoring devices.

Note—ST is not measured or trended when there is a LEADS OFF INOP.

Navigation Choices

You can use the navigation area on the bottom part of the ST Review Window to select a focus for the ECG waves. For all navigators, a solid color line is shown for each ST cursor and the baseline ST measurement (if set). Red is used for the baseline; green for ST Cursor 1; gold for ST Cursor 2; cyan for ST Cursor 3; purple for ST Cursor 4 (ST Cursor 3 and 4 available in dual-display systems only).

The choices are:

- **Trends**

Use the Trend navigator to display a single trend graph and scan the trend for significant changes. The choices available to you in the Trend Navigator depend on whether or not you have Trend Groups selected in the Trend Review window (see “Trend Review” on page 6-17). With Trend Groups selected in Trend Review window you can select the trend group you would like to see. With Trend Groups not selected in the Trend Review window, you can select parameters to trend by selecting from the **Parameter** drop-down lists. Use the top Parameter drop-down list to change the left parameter. Use the bottom Parameter drop-down list to change the right parameter. Moving the cursor by clicking in or, for touch screen displays, touching the trend area displays the waves for that time period.

- **Trend Table**

The ST Review window with the Trend Table navigator displays parameter data in rows and columns suitable for charting purposes. When you select Trend Table as the navigator a table displays on the bottom of the ST Review window. The table includes:

- Up to 140 rows of averaged data points for the specified parameters.
- Up to 17 columns of time indicators spaced per the selected time resolution.
- Parameter label for each displayed parameter is always in black.
- A highlighted column corresponding to the nearest minute for the current time focus. In addition a shaded gray rectangle appears in the trend graph area corresponding to the number of minutes of tabular data being displayed and the duration of the timeline.

- **Events**

Use the Event navigator to display the events and look at ECG waves for events of interest. The event bars have different colors depending on level of severity:

- Red = life-threatening alarms
- Yellow = limit violation alarms
- Cyan = all INOP conditions and non-alarming events including arrhythmia events

To see data for an event of interest (for example, an episode of V-TACH), move the cursor in the event area. You can change the time focus by using the arrow buttons. To view a different Event Group, with Event selected as the navigator, select the event from the **Event Group** drop-down list.

- **Timeline**

The timeline navigator at the bottom of the display indicates the time and date. You can click on or, for touch screen displays, touch the timeline to see waves for a different period of time or change the time focus by using the arrow buttons. The timeline has 3-6 ticks depending on the time duration. You can change the time duration by selecting a different time from the **Time** drop-down list on the bottom of the window.

- **ST Topology**

Use ST Topology navigator to view a color depiction of ST changes over time. When you select ST Topology a color bar displays on the bottom of the window showing changes in ST values. A progression of ST depression or elevation across multiple leads across time is indicated by a band of color that shifts from one lead to another. The top color (red) corresponds to any ST value that is equal to or greater than the maximum positive ST value. The bottom color (blue) corresponds to any ST value that is less than or equal to the maximum negative ST value. Any values in between are shading slightly red for positive values and slightly blue for negative values. An ST value near 0.0 mm is mapped to a green color. If an ST lead is not available at a specific time, it displays in the color bar as white.

You can adjust the maximum ST values by using the up and down arrows next to the color bar. When you change the ST maximum by using the up and down arrows the colors re-display with the new setting.

All measured ST leads are displayed over time from top to bottom. Right mouse click on the strip to see the ST leads measured at that point in time as well as the exact lead the cursor is currently positioned on. The lead order is always limb leads (aVL, I, -aVR, II, aVF, III) followed by chest leads (V6 to V1 or V, MCL).

Note—Right mouse click functionality is not available on touch screen displays.

Using the ST Cursor Buttons

You can move one ST Cursor at a time by selecting the **ST Cursor** radio button. When you select a time on the navigator or use the arrow buttons, it is this single ST cursor that is moved. Each time an ST cursor is moved, the corresponding ST snippets for that time are displayed in the ST Review window.

You can display the ST snippets and their values by selecting the **ST Cursor** button. Multiple ST snippets/values may be highlighted at the same time. When multiple ST values are shown, they are always displayed top-down: ST1, ST2, ST3, ST4, ST-baseline. When exactly two values are shown, a difference between the values is displayed.

Using ST Review

The table below describes how to use the ST Review Window.

If you want to...	Do this...
Set a new baseline for reference	<ol style="list-style-type: none"> 1. Use the Navigators to find the time you want to use as a baseline. 2. Review the ECG snippets. 3. Select Set Baseline.
Display the baseline value in the Navigator	Select the Show Baseline button.
Superimpose the current measurement points (ISO and ST) on to the ST segment	Select the Measurement checkbox.

If you want to...	Do this...
Move one ST Cursor at a time	Select the ST Cursor radio button. When you select a time on the navigator or use the arrow keys, it is this single ST cursor that is moved. Each time an ST cursor is moved, the corresponding ST snippets for that time display in the ST Review window.
Display the ST snippets and their values	Select the ST Cursor button. Multiple ST snippets/values may be highlighted at the same time. When multiple ST values are shown, they are always displayed top-down: ST1, ST2, ST3, ST4, ST-baseline. When exactly two values are shown, a difference between the values is displayed. For systems with Dual displays 4 cursor buttons are available.
Print a report	Select the Print button generates a printout with the contents of the screen.
Change the size of ST wave	Click on or, for touch screen displays, touch the calibration bar then select the wave size from the pop-up list that displays.
Change the speed of the ST wave	Select a speed (25. 0 or 50.0 mm/s) from the Speed drop-down list on the right side of the window The window re-displays with the selected speed.
See a moving indicator of ST changes over time (dual-display systems only)	<ol style="list-style-type: none"> 1. Using the Timeline, Trend, or ST Topology as the Navigator, select at least two ST cursors to display. 2. Select the Animate radio button. 3. Select and hold the right or left single arrow button. The ST Review window superimposes ECG snippets moving in time backward or forward respectively.

12-Lead Review

Overview

Depending on your system, you can use the 12-Lead Review Window to view 10-second retrospective review of the 12 EASI derived ECG waves for EASI enabled bedside monitors and telemetry or to see the results of 12 Lead Captures performed at a wired IntelliVue Patient Monitor.

Note—EASI derived 12-lead ECG's and their measurements are approximations to conventional 12-lead ECG's and should not be used for diagnostic interpretations.

12-Lead Review with 12 Lead Captures

When the data is captured using a standard 10-wire lead set 10 seconds of the wave data along with the ECG analysis interpretation statements and measurements can be reviewed in the 12-Lead Review. See the *Philips 12-Lead Algorithm Physician's Guide* (M5000-91000) for a complete list of the interpretation statements.

When the data is captured using EASI leads 10 seconds of the wave data and interval measurements may be reviewed in the 12-Lead Review. Interpretation statements are not available when the capture is performed using EASI lead placement.

Note—When a filter bandwidth change is made on the IntelliVue Patient Monitor prior to performing a 12-lead ECG capture it may take up to a minute for that change to be communicated to the Information Center. To ensure that the correct bandwidth displays on the desired 12-lead capture you need to wait at least a minute after changing the bandwidth before performing the capture.

Using this Window

The table below describes how to use the captured 12-Lead Review Window.

If you want to...	Do this...
Select a particular capture for display	On the bottom of the 12-Lead Review window select the tabs labeled with dates and time to display a capture for a particular time.
Switch to a continuous view	If EASI wave storage is available on this system, navigate to a continuous view by unchecking the Captured 12 Leads checkbox.
Hide the statements	If interpretation statements are available, hide the statements by unchecking the Statements checkbox.
Export the data to a networked machine or to the Information Center floppy drive	For systems with the 12 Lead Export feature available, select the Export button. The 12-Lead Review Export window displays. See “12-Lead Export Window” on page 6-48 for information on using the export feature.
Delete the currently viewed 12 Lead capture	Select the Delete button.
Change the wave layout	Click on or, for touch screen displays, touch the wave layout on the top right side of the window then select wave layout (3x4, 6x2, or 12x1) from the list that displays. In 3x4 layout an additional rhythm lead displays.
Change the rhythm lead	Click on or, for touch screen displays, touch the the rhythm lead label (for 3x4 only) on the bottom left of the window then select a lead from the list that displays (I, II, III aVR, aVL, aVF, V1, V2, V3, V4, V5, V6).
Change the wave size	Click on or, for touch screen displays, touch the cal bar then select the size of the wave you want.

If you want to...	Do this...
Change the wave speed	Click on or, for touch screen displays, touch the speed on the bottom right of the window then select the speed from the list that displays (25 mm/s or 50 mm/s). When you select a different speed the window re-displays with the selected speed.
Print a report	Select the Print button. The 3x4 or a 6x2 format prints in landscape layout and the 12x1 format prints in portrait layout. The information contained in the 12-Lead Window prints along with the following additional information: <ul style="list-style-type: none"> • Size: mm/mV • Speed: mm/s • Patient's name and medical record number • Bandwidth

EASI Derived 12- Lead Review

The 12-Lead Review window provides 10 second retrospective review of the 12 EASI derived ECG waves. You can navigate within the window by using the arrow buttons to the right of the window or by using the Navigator on the lower portion of the window. You can page forward or backward by either 1-second intervals or by 10-seconds intervals.

Navigation Choices

The EASI derived 12 Lead Review allows you to view waves using the following navigation choices:

- **Trends**

Use the Trend navigator to display a single trend graph and scan the trend for significant changes. The choices available to you in the Trend Navigator depend on whether or not you have Trend Groups selected in the Trend Review window (see “Trend Review” on page 6-17). With Trend Groups selected in Trend Review window you can select the trend group you would like to see. With Trend Groups not selected in the Trend Review window, you can select parameters to trend by selecting from the **Parameter** drop-down lists. Use the top Parameter drop-down list to change the left parameter. Use the bottom Parameter drop-down list to

change the right parameter. Moving the cursor by clicking in or, for touch screen displays, touching the trend area displays the waves for that time period.

- **Tabular Display**

The 12-Lead Review window with the Tabular Display navigator displays parameter data in rows and columns suitable for charting purposes. When you select Tabular Display a table displays on the bottom of the window.

The table includes:

- Up to 140 rows of averaged data points for the specified parameters.
- Up to 17 columns of time indicators spaced per the selected time resolution.
- Parameter label for each displayed parameter is always in black.
- A highlighted column corresponding to the nearest minute for the current time focus. In addition a shaded gray rectangle appears in the trend graph area corresponding to the number of minutes of tabular data being displayed and the duration of the timeline.

- **Events**

You can display the Events and look at waves for events of interest. The Event navigator has bars for each event code. The event bars have different colors depending on level of severity:

- Red = life-threatening alarms
- Yellow = limit violation alarms
- Cyan = all INOP conditions and non-alarming events including arrhythmia events

To see data for an event of interest, move the Navigator cursor bar by using the arrow buttons or clicking on or, for touch screen displays, touching the event line. Moving the cursor by clicking in or touching the event area displays the waves for that event. To change the Event Group, select a different group from the Event Group drop-down list.

Note—For IntelliVue Patient Monitors, non-arrhythmia yellow alarms appear in All Alarms and in Yellow Alarms but not in Bed Alarms.

- **Timeline**

You can click on or, for touch screen displays, touch the timeline to see waves for a different period of time. The timeline indicates the time and date. The timeline has 3-6 ticks depending on the current time period selected.

Using This Window

The table below describes how to use the EASI derived 12-Lead Review Window.

If you want to...	Do this...
Navigate to a 12-lead captures view	For systems with 12-lead captures available, navigate to a captured view by selecting the Captured 12 Leads checkbox.
Export the 12 lead data to a networked machine or to the Information Center floppy drive	For systems with the 12 Lead Export feature available, select the Export button. The 12-Lead Review Export window displays. See “12-Lead Export Window” on page 6-48 for information on using the export feature.
Change the wave layout	Click on or, for touch screen displays, touch the wave layout on the top right side of the window the select wave layout (3x4, 6x2, or 12x1) from the list that displays. In 3x4 layout an additional rhythm lead displays.
Change the rhythm lead	Click on or, for touch screen displays, touch the the rhythm lead label (for 3x4 only) on the bottom left of the window then select a lead from the list that displays (I, II, III aVR, aVL, aVF, V1, V2, V3, V4, V5, V6).
Change the wave size	Click on or, for touch screen displays, touch the cal bar then select the size of the wave you want.

If you want to...	Do this...
Change the wave speed	Change the speed to 25 mm/s, or 50 mm/s by clicking on or, or for touch screen displays, touching the speed on the bottom right of the window then selecting the speed from the list that displays. When you select a different speed the window re-displays with the selected speed.
Print a report	Select the Print button. The information contained in the 12-Lead Window prints along with the following additional information: <ul style="list-style-type: none">• Size: mm/mV• Speed: mm/s• Patient's name and medical record number• EASI bandwidth

12-Lead
Export
Window

Use 12 Lead Export window to export the 12 lead data to a networked machine or to the Information Center floppy drive.

Note—The data that is accepted at the time of export is determined by the receiving system.

After selecting the **Export** button in the 12 Lead Review window, perform the following steps to export the data:

Step	Action
1	Type a 1- to 32-character name of the person initiating the export in the Operator field.
2	Type a 1- to 32-character physician's name in the Physician field.
3	Select a maximum of 4 medications by selecting the checkbox next to the Medication name.
4	Select a maximum of 4 diagnostic items by selecting the checkbox next to the Diagnosis name.

Step	Action
5	If you would like to have an explanation for requesting this export appear on the export report, type a 1- to 32-character explanation in the Test Reason field.
6	Select as destination to which to export the data by selecting the location from the Destination drop-down list.
7	Verify that you have correct patient selected and demographic information is correct then select the Send button to initiate the export. <i>Note</i> —Timestamps between the Information Center and the receiving device may not match due to differences in timestamp location for the receiving device.
8	You can check the status of the export by selecting the Status Logs button from the All Controls window then selecting the Transfer Status tab from the Status Logs window.

The following additional data is exported to the Destination location:

- Demographic data including patient name, medical record number, date of birth, gender, height, and weight

Important: For patients where 12 leads are captured and exported, the patient should be admitted with name, medical record number, gender, and date of birth.

- Acquisition type (whether monitoring conventional 12 lead or EASI 12 lead) label.
- Hospital name.

Export Data to Holter System

Overview

For Information Centers connected to the M3154 Database Server the Information Center provides the ability to export ECG waveform data from the Information Center to a Zymed Holter for Windows™ - Model 1810/2010 with version 2.6 software or higher. This allows a clinician to order holter analysis on ECG data acquired by the Information Center thereby eliminating the need to have the patient monitored separately by patient-worn holter monitor prior to the analysis.

The patient must be admitted before you can export their data to the holter system. You can only initiate one data export at a time. If you initiate a data export while one is in progress the Information Center presents you with a dialog box where you can choose to terminate the export in progress or allow the export in progress to continue.

You can send up to 96 hours of stored data. The time it takes to export the data to the holter system can vary and could take several minutes depending upon the amount of data that was requested.

Note—If your patient will be changing between standard and EASI lead placement you should perform an export of data before changing the type of monitoring.

**Task
Summary**

To export a patient’s ECG data to a holter system for analysis perform the following steps:

Step	Action
1	Select the All Controls button from the task bar on the bottom of the window. The All Controls window displays
2	Under Configuration and Support select the Holter Export button. The Holter Export window displays.
3	Select the patient for which you are exporting data by selecting the name from the drop-down list on the top left of the Holter Export window.
4	If you would like to have a physician’s name appear on the holter report, type a 1- to 19-character physician’s name in the Physician field.
5	If you would like to have an explanation for requesting this export appear on the holter report, type a 1- to 23-character explanation in the Test Reason field.
6	Specify the amount of data you want to send to the holter system for analysis. The choices that are available for selection depend upon the total amount of ECG data currently stored for this patient.

Step	Action						
7	Select the Export button to send the data to the holter system. If an export of data is already in progress a dialog box displays.						
	<table><tr><th>If you want to</th><th>Then</th></tr><tr><td>Cancel the export in progress</td><td><div>1.Select the Stop Export button. The export in progress stops and you return to the Holter Export window. <i>Note</i>—If you are not sure who initiated the export do not select the Stop Export button unless you are certain the data does not need to be sent.</div><div>2. Select the Export button. The export you initiated continues.</div></td></tr><tr><td>Continue the export already in progress</td><td><div>1.Select the OK button. The export in progress continues and you return to the Patient Window.</div><div>2. Try the export again later by repeating Steps 1 through 8.</div></td></tr></table>	If you want to	Then	Cancel the export in progress	<div>1.Select the Stop Export button. The export in progress stops and you return to the Holter Export window. <i>Note</i>—If you are not sure who initiated the export do not select the Stop Export button unless you are certain the data does not need to be sent.</div> <div>2. Select the Export button. The export you initiated continues.</div>	Continue the export already in progress	<div>1.Select the OK button. The export in progress continues and you return to the Patient Window.</div> <div>2. Try the export again later by repeating Steps 1 through 8.</div>
	If you want to	Then					
	Cancel the export in progress	<div>1.Select the Stop Export button. The export in progress stops and you return to the Holter Export window. <i>Note</i>—If you are not sure who initiated the export do not select the Stop Export button unless you are certain the data does not need to be sent.</div> <div>2. Select the Export button. The export you initiated continues.</div>					
Continue the export already in progress	<div>1.Select the OK button. The export in progress continues and you return to the Patient Window.</div> <div>2. Try the export again later by repeating Steps 1 through 8.</div>						
8	You can check the status of the export by selecting the Status Logs button from the All Controls window then selecting the Transfer Status tab from the Status Logs window.						

Changing the Waves that are Stored

Overview

You can select the waves that are stored for a patient in the data review applications.

You can select the waves for Wave Review, and you can select the waves for alarms automatically stored in Alarm Review as well as waves for user-saved strips. Waves are changed in the Stored Waves Window.

Task Summary

Change the stored waves by performing the following steps:

Step	Action
1	On the Patient Window for the appropriate sector, select the All Controls button, then Stored Waves .
2	<p>There are two tabs:</p> <p>Select Continuous Waves to select the waves stored in full disclosure (Wave Review) and for strips saved to Alarm Review from Wave Review and Event Review.</p> <p>Select Alarm Waves to select the waves saved in Alarm Review as well as strips saved by the action of the patient sector button (if configured).</p> <p><i>Note</i>—If Primary or Secondary is a wave in one of the other selections, that wave is only stored once.</p>
3	<p>Select each wave by selecting the parameter in the list.</p> <p><i>Note</i>—Selecting the Unit Settings button changes the settings to the unit defaults. Selecting the Restore Settings button reverts to the settings that were in place before any changes were made.</p>

Note—This application affects the stored waves. To change the waves that are displayed from the IntelliVue Patient Monitor, CMS or V24 and V26 bedside monitor, you must change the system waves. The waves that are displayed from M3 monitors are fixed.

Scheduled Reports

Overview

The Scheduled Reports windows allow you to schedule and print patient reports on demand or on a regularly scheduled basis. The patient must be admitted before any reports can be scheduled and initiated. Access the Scheduled Reports windows by selecting **Scheduled Reports** on the All Controls window.

From the Scheduled Reports window you can set up and print the following reports for a patient by selecting the appropriate tab on the top of the window:

- All Reports (see page 6-54)
- Trend Report (see page 6-56)
- Alarm Report (see page 6-58)
- Event Report (see page 6-59)
- Wave Report (see page 6-60)
- Summary Report (see page 6-62)

All Reports

Use this window to generate one or more reports to be printed on a scheduled basis for the currently selected patient.

Note—To see the current settings for a particular report select the appropriate report tab on the top of the window. You can then customize the settings and print the report from the window that displays.

Perform the following steps to schedule reports for the current patient:

Step	Action
1	Select the reports to print for this patient by selecting the checkbox next to the report name. A checkmark in the checkbox selects the report for printing.
2	<p>Indicate the time for which you want reports to start by specifying the time in the Start Time field. Specify the hour by clicking on or, for touch screen displays, touching the hour in the Start Time then using the up and down arrows until the desired time displays. Specify the minutes by clicking on or touching the minutes in the Start Time then using the up and down arrows until the desired minutes display. Minutes are specified in 15 minute increments.</p> <p><i>Note</i>—You can also specify start time by clicking on or touching the hour or minutes then typing the time using the keyboard.</p>
3	Indicate how often you want the reports to occur by selecting a time from the Frequency drop-down box.
4	<p>If you would like to print the selected reports now select the Print Report Now button.</p> <p>Select the Unit Settings button to cancel any changes made in this window and return the scheduled reports settings back to unit defaults.</p>

**Trend
Report**

Use the Trend Report window to set up and print a Trend Report for the current patient. The amount of data that the Trend Report will contain depends on the time frequency specified in the All Reports window. For example, if the time frequency is 8 hours the report will only show data for the previous 8 hours.

Perform the following steps to set up and print a Trend Report for this patient:

Step	Action
1	Specify the maximum number of pages this report should contain by selecting the number of pages from the Maximum Pages drop-down list. Select Unlimited if you want to print all possible trend data regardless of length. When you specify a specific number of pages the report will stop when that number of pages is reached regardless of whether there is more data or not.
2	Select the trend group for this report from the Trend Group drop-down list.

Step	Action
3	<p>Specify whether you want the report to print in tabular or graphical format by selecting the appropriate Report Type radio button. Select Tabular if you want to print the trend data in rows and columns suitable for charting purposes. The tabular Trend Report contains:</p> <ul style="list-style-type: none"> • Time labeled columns • Parameter label for each row • Parameter average value for each trend corresponding to time column (aperiodic values show as the latest value for that column) • Date and time of time cursor at top of display • Highlighted row indicating time cursor. <p>Select Graphic Trend if you want to print the report with the 5 graphic trends from the Trend Group. The graphic Trend Report contains:</p> <ul style="list-style-type: none"> • Parameter label(s) for each trend line • Parameter value(s) for each trend corresponding to current time cursor position • Date and time of time cursor at top of display • Vertical line time cursor indicator • Parameter scale indicators (same as scale on display at time of print request) • Time line
4	<p>For tabular reports specify the trend interval by selecting the time from the Trend Interval drop-down list.</p>
5	<p>If you would like to print the Trend Report now select Print Report Now button. You can select the Unit Settings button to cancel any changes made for this patient and return the Trend Report settings back to unit defaults.</p>

Alarm Report

Use the Alarm Report window to set up and print a Alarm Report for the current patient. The amount of data that the Alarm Report will contain depends on the time frequency specified in the All Reports window. For example, if the time frequency is 8 hours the report will only show data for the previous 8 hours.

Perform the following steps to set up and print a Alarm Report for this patient:

Step	Action
1	Specify the maximum number of pages this report should contain by selecting the number of pages from the Maximum Pages drop-down list. Select Unlimited if you want to print all possible alarm data regardless of length. When you specify a specific number of pages the report will stop when that number of pages is reached regardless of whether there is more data or not.
2	Select the alarm group for this report from the Alarm Group drop-down list.
3	Specify whether you want an alarm report or strip report by selecting the appropriate Report Type radio button.
4	If you would like to print the Alarm Report now select Print Report Now button. You can select the Unit Settings button to cancel any changes made for this patient and return the Alarm Report settings back to unit defaults.

Event Report

Use the Event Report window to set up and print a Event Summary Report for the current patient. The Event Summary Report contains:

- A graphic trend of HR for the most recent 24 hours.
- A graphic trend of PVC for the most recent 24 hours.
- A tabular trend for HR (max, median, min) for the most recent 24 hours.
- A tabular trend of event counts for each of the event group entries for the displayed event group for the most recent 24 hours.
- For the selected event group, the most recent strips of each event type.

Perform the following steps to set up and print a Event Report for this patient:

Step	Action
1	Specify the maximum number of pages this report should contain by selecting the number of pages from the Maximum Pages drop-down list. Select Unlimited if you want to print all possible event data. When you specify a specific number of pages the report will stop when that number of pages is reached regardless of whether there is more data or not.
2	Select the event group for this report from the Event Group drop-down list. The report will print all events configured for this event group.
3	If you would like to print the Event Report now select Print Report Now button. You can select the Unit Settings button to cancel any changes made for this patient and return the Event Report settings back to the unit defaults.

Wave
Report

Use the Wave Report window to set up and print a Wave Report for the current patient.

Perform the following steps to set up and print a Wave Report for this patient:

Step	Action
1	Specify the maximum number of pages this report should contain by selecting the number of pages from the Maximum Pages drop-down list. Select Unlimited if you want to print all possible wave data regardless of length. When you specify a specific number of pages the report will stop when that number of pages is reached regardless of whether there is more data or not.
2	<p>Specify whether you want a wave report, a strip report or a 12 lead report by selecting the appropriate Report Type radio button.</p> <p>Wave Report prints a compressed full disclosure wave report. The waves that the report will contain depend on the waves selected in the Wave Report Settings field and whether waves have been stored for the given time interval.</p> <p>Strip Report prints a periodic sample of the full disclosure waves for this patient. The waves that appear depend on what was stored for the specified time interval. The time between each strip on the report is determined by the time specified in the Strip Interval field. Each strip is approximately 6 seconds.</p> <p>Twelve Lead prints a report of the EASI wave data stored for this patient. This report is a single page report containing a single 12-lead derivation of the EASI waves for this patient at time of the report.</p>
3	If you selected Wave Report in Step 2, specify the waves (1 to 4) to be included in the report by selecting the appropriate checkbox(s) in the Wave Report Settings field. The waves available here correspond to the waves selected in the Stored Waves window.
4	If you selected Wave Report in Step 2 indicate the number of minutes of waves to compress per page by selecting the minutes from the Minutes per Page drop-down list.

Step	Action
5	If you selected Strip Report in Step 2 indicate what the time interval between strips should be by selecting a time from the Strip Interval drop-down list.
6	If you would like to print the Wave Report now select Print Report Now button. You can select the Unit Settings button to cancel any changes made for this patient and return the Wave Report settings back to unit defaults.

Summary/
Unit Report

Use the Summary Report window to set up and print either an individual patient report or a unit report for all patients currently admitted and assigned to this Information Center.

Perform the following steps to set up and print a Summary Report:

Step	Action
1	<p>Specify whether to print a Patient Report or a Unit Report by selecting the appropriate radio button in the Report Type field.</p> <p>A Patient Report prints a report for the current patient and contains:</p> <ul style="list-style-type: none">• Patient name and ID• Bed label• Care group status• Height, weight, sex, age, patient type and paced setting• Screen notes• Current vital signs (latest 1 minute average value), rhythm status and ectopic status• Active alarms and INOP text• Any deviations of this patient’s current settings as compared to the unit settings• A 6 second 25 mm/sec sample strip of the first two stored waveforms for this patient at time of report. <p>Unit Report prints a multi-page report for all patients currently admitted and assigned to this Information Center. For each patient the report contains:</p> <ul style="list-style-type: none">• Patient name and ID• Bed label• Care group status• Height, weight, sex, age, patient type and paced setting• Screen notes• Current vital signs (latest 1 minute average value), rhythm status and ectopic status• Active alarms and INOP text• Any deviations of this patient’s current settings as compared to the unit settings• A 6 second 25 mm/sec sample strip of the first two stored waveforms for this patient at time of report.

Step	Action
2	<p>If you are printing a unit report specify whether to print the report in Compact format or One Page Per Patient format by selecting the appropriate radio button in the Unit Report Settings field.</p> <p>In Compact format, the report does not include the wave sample and all patient information is packed into the fewest number of pages. In One Page Per Patient format the wave sample is included and each patient report appears on a single page.</p>
3	<p>If you would like to print the Summary Report now select Print Report Now button. You can select the Unit Settings button to cancel any changes made for this patient and return the Summary Report settings back to the unit defaults.</p>

Information Center Web Access

Overview

The Information Center Web access option provides ‘patient window-like’ web viewing of near-realtime waves, parameters and alarms without controls for patients across care units using standard PC browsers. It provides the current alarm and INOP states for the patient, but does not provide an alert notification function. It also allows for web viewing of all Information Center Review Windows of all retrospective data for patients across care units that are on separate database servers. You can view data formatted for Web access, using one of the following supported browsers:

- Microsoft Internet Explorer, version 5.0 or higher.
- Netscape Navigator (revision 4.7 or higher).

For information on setting up the system, please see the Information Center Service Manual.

Warning

Web Access should not be used for primary monitoring. Near real-time information is delayed slightly from the primary monitoring data. The delay is generally minimal. Always refer to your primary monitoring source (bedside monitor or Information Center) for current real-time data.

Intended Use

The Information Center Web application is intended for read-only viewing of patient's physiologic data, at remote locations via the hospital's HIS LAN web access (hospital intra/internet). Including review of existing Alarm, Event, Wave, Trend, and ST segment (adults) to gain information for treatment, to monitor adequacy of treatment, or to exclude causes of symptoms. The Information Center Web is a retrospective application that provides access to near real-time physiologic data or alarms, and is not intended to support real-time event annunciation or triage of real-time clinical situations. All access to data is read-only.

The clinical use of the information provided by the Information Center Web is to supplement information gathered through other means.

Note—You must use the 25 mm/s annotation (0.2s), rather than a ruler, on an image on the Information Center Web screen or in printed reports from the Information Center Web to make accurate measurements on waveforms.

Accessing the Information Center Web

The method of accessing the Information Center Web depends on how your system is set up. The functionality of Information Center Web applications is comparable to the Multilead ECG/12-Lead ECG, Alarm Review, Event Review, Trend Review, Wave Review, ST Review, 12-Lead Review and Captured 12-Lead Review applications on the Information Center.

Access the Information Center Web by performing the following steps:

Step	Action
1	Log on to your account, and access the Information Center Web Logon screen, using the URL supplied by your system administrator.
2	<p>On the log-on screen:</p> <p>In the User Name field, enter your first and last name.</p> <p>In the Password field, enter the password supplied by your system administrator.</p> <p>Note—If the ICA File Security message displays select the Full Access and Never Ask me again for any application radio buttons then select OK.</p>

Step	Action
3	<p>The Patient List is displayed, containing all beds in the clinical units for which you have access and are being actively monitored by an Information Center. If the patient has been admitted to the Information Center, the name and Medical Record Number are displayed along with the bed label.</p> <p>Select the patient or bed you want.</p> <p>Before you view retrospective data, verify that the patient name displayed is the one you chose.</p>
4	<p>Before you view retrospective data, verify that the patient name displayed is the one you chose. The bed label and patient name/ Medical Record Number (if available) is displayed at the top the window (and is displayed at the top of all other application windows).</p>
5	<p>Select the application from the list at the left.</p> <p>Navigation buttons appear on each application to enable you to view the desired data. The applications are equivalent to the Data Review applications at the Information Center, with the same specifications, such as maximum number of alarms available, number of hours of waveform data, etc.</p> <p>See the pages that follow for instructions on individual applications.</p>
6	<p>To select a different patient, select Patient List to get the list of all beds on the Database Server or on the Unit to get a list of beds in a specific unit.</p>
7	<p>To end the session, select Logout, at the left.</p>

Notes on Use

- Controls at the top of the review windows allow you to view data in various ways. After changing a setting, you must select the **Update** button to have it take effect.
- Settings selected in one application persist for other applications. That is, if you select a time focus in Trend Review, when you go to ST Review, the data will have the same time focus. The setting remains until you change it or select another patient.
- If more waves or parameters than can be displayed on one page exist the **More Data** button displays on the right side of the window. Select the button to see the next page of waves or parameters.
- To print all of the content in a report, in the File menu, go to Page Setup, and change both the Left and Right margins to 0.2", and select "Landscape" when printing.
- The browser controls, such as Back, Refresh, Save, Print, and Stop operate as they normally do with other web applications.
- To refresh the application window, right-click in the window, and click **Refresh** on the popup menu.
Note—Right mouse click functionality is not available on touch screen displays.

Multilead ECG

This screen displays a snapshot view of all available ECG leads, based on the monitoring device. To retrieve the latest data, select the **Update** button.

If the patient is monitored by EASI ECG, the 12 derived leads will be shown.

Note—This may take a few seconds while the data is collected.

You can change the format, if desired, by selecting either **International** or **Cabrera**.

Alarm Review

The default is ALL ALARMS. You can select the alarm filter to indicate the specific group of alarms to view, for example, RED ALARMS.

- The alarms will appear in chronological order in a tabular list with the number and count for that alarm type, date/time of the alarm and alarm text.
- Select the date/time of each alarm to view the alarm strip; use the arrow keys to view the entire strip.
- Select **Previous Alarm** or **Next Alarm** to move back and forth sequentially within the list of alarms or use the tabular list.

Trend Review

Select the trend group label to access the available trends for the group, then on the trend you want. Select an individual parameter to display the trend for that parameter

- Select the **Duration** control to bring up a list of time spans (All available, 24, 12, 8, 4, or 1 hour). “All Available” shows a trend covering all data stored in the database for the selected parameter(s).
- Select a trend to change the time focus (indicated by the vertical cursor).

Displaying Data in Tabular Format

You can display the trend information for continuous measurements in a tabular format by selecting **All Parameters**, at the bottom of the Trend Review screen.

- The data for the most recent hour is displayed when you enter the screen.
- To select data for a different one-hour period, select the appropriate button at the top of the screen.
- The data samples are displayed at a one-minute resolution.
Note—The cell will be blank if during the one-hour period, there is no data available (for example, if the parameter was turned off).
- To display a trend plot for a parameter at a specific time, select the parameter name in the leftmost column. This brings up Trend Review with the trend plot for that parameter and time.
- Tabular review time duration can be changed by selecting one of the time buttons at the top of the display (there are always 24 buttons – one for each hour)

Event Review

The Event Review screen displays the pre-configured event groups.

- To get greater detail for an event, select (or near) the event marker itself. (To make selection of the event easier by zooming in to a shorter time period, change to a shorter duration.)
- You will get the Start Time, End Time, and text of the event, as well as a scrollable waveform strip at the selected time. You can then select a different time by clicking on or, for touch screen displays, touching the timeline.

Wave Review

The Wave Review screen displays a 30-minute compressed waveform; each segment has 2 minutes of data.

- To see the segment in detail, select it. You will get a strip with up to four waves at 25 mm/s with beat labels and parameters.
- To select a different time, click on or, for touch screen displays, touch the timeline.

ST Review

The ST Review screen displays a trend plot and all available ECG wave segments. The number of leads displayed depends on the monitoring device.

- When this application is accessed, the trends displayed are the ones selected in Trend Review. If no trend has been selected, the default plot is Heart Rate. The time focus and plot duration were the ones selected in another Information Center Web application. If none have been set, the defaults are the current time and “All Available”.
- To change the time focus, click on, for touch screen displays, touch anywhere on the trend plot. The ECG waves will reflect the new time.
- To change the trends, select the **Left Parameter** or the **Right Parameter**, and select from the list.
- To set a baseline for a reference ST, select **Set Baseline**. Then, to observe ST changes between the baseline and another point in time, select another time focus. The baseline waves will be superimposed over the waves for the new time focus, and the ST values will show the values for the baseline, the new time focus, and the delta value.
- You can change the format, if desired, by selecting either International or Cabrera.

12-Lead Review

The 12-Lead Review screen displays a retrospective review of the 12 EASI derived ECG waves for EASI enabled bedside monitors and telemetry when you select the **12-Lead Review** button on the left side of the window or the results of 12 Lead Captures performed at an IntelliVue Patient Monitor when you select the **Captured 12-Lead** button on the left side of the window.

- Controls for layout, wave speed, wave size (x1/2, x1, x2) and International/Cabrera are on the top of the window.

7

Alarm Paging

This chapter describes the using the Alert Data Integration™ paging system. It includes the following sections:

- Introduction. 7-2
- Assigning Beds/Alarms to a Paging Device. 7-5
- Sending Manual Pages 7-7
- Specifying Alarms for Automatic Paging. 7-9
- Viewing Paging Device/Bed Assignments. 7-10

Introduction

Optionally, the Information Center includes the Alert Data Integration™ paging system (available in limited geographies) for secondary notification of patient alarms. The paging system acquires patient alarm data from the bedside or the telemetry monitoring system and relays it in textual format to a paging device such as a pager or cell-phone. No waveform data is sent.

Warning

The paging system is a secondary alarm notification system. It is not for primary notification of alarms, physiological, or demographic data. Receipt by the external software device of alerts is not confirmed and delivery to the end device is not guaranteed. Clinicians using the paging system must remain within monitoring distance of the primary alarm notification device. The primary alarm notification device is the bedside monitor if there is one. If there is no bedside monitor the primary alarm notification device is the Information Center.

At the Information Center you can:

- Assign/unassign beds to a paging device and specify the types of alarms that will generate a page to the device.
- Specify the alarms that will generate an automatic page through the Record/Store/Page window.
- Manually send a page to a paging device(s) from Fast Alarm Review.
- Send a text message to a paging device by selecting the **Page** button in the Patient Window.
- View all current bed to paging device assignments and the alarms set up to generate a page to the device by using the Paging Controls View window.

Data Sent

Alarms are sent in the order in which they occur. So, if a yellow alarm occurred for one bed immediately followed by a red alarm for another bed the yellow alarm is sent first followed by the red.

If a parameter value is invalid at the time of the page, then its value is not displayed. If a parameter does not exist at the time of the page, then the parameter label and value are not displayed. The SpO2 and NBP value are the nearest values to the time of alarm within the last 60 minutes.

When an alarm is silenced (acknowledged/audio paused) a cancel message is sent out to the paging system. If the alarm page has not been sent yet it is canceled and not sent out. If the alarm page has already been sent the paging system will clear the message on the paging device.

Alarms **For beds with a paging device assigned**

The format of the alarm data sent is:

- bed label:: alarm level (high, medium, low priority), alarm text, and parameter text (for example Bed4:*** Asystole HR 0 SpO2 92 NBP 120/90).

For beds without a paging device assigned:

The format of the alarm data sent is:

- bed label:UNA alarm level (high, medium, low priority), alarm text, and parameter text (for example Bed4:UNA *** Asystole HR 0 SpO2 92 NBP 120/90).

Reminder Alarms

Only the following alarms are paged on reminder:

- All telemetry red and INOP alarms
- All SDN bedside arrhythmia red alarms

For beds with a paging device assigned

The format of the alarm data sent is:

- bed label: REM alarm level (high, medium, low priority), alarm text, and parameter text (for example Bed4:REM *** Asystole HR 0 SpO2 92 NBP 120/90).

For beds without a paging device assigned

The format of the alarm data sent is:

- bed label:UNA REM alarm level (high, medium, low priority), alarm text, and parameter text (for example Bed4:UNA REM *** Asystole HR 0 SpO2 92 NBP 120/90).

Loss of Connection to Database Server

Should you lose connection to the Database Server, Alert Data Integration will not be available and no clinical alarms will be sent to or received by the paging devices. When connection to the Database Server is lost the system message “operating on local DB” displays on top of the screen. In addition a *** alarm indicating that the paging option is not available is sent out to the all the paging devices for each Information Center with the Alert Data Integration option available. For example, when the Information Center named ICU2 loses connection to the Database Server the message “ICU2::***No Alarm Paging” will display all the paging devices with beds assigned to them. See “If Connection to the M3154/M3169 Database Server is Lost” on page 10-27 for additional information.

If connection between the Information Center and Alert Data Integration receiving device is lost for any reason no alarms are sent and the message “Alarm paging not available” displays in the Information Center system message area.

Assigning Beds/Alarms to a Paging Device

Overview

Use the Paging Controls Setup window to assign beds to a paging device as well as specify the types of alarms (red, yellow, INOPs) that will generate a page to the paging device.

Note—The Record/Store/Page window allows you to choose the specific alarm that will generate a page. See “Specifying Alarms for Automatic Paging” on page 7-9 for details.

Task Summary

To assign or unassign beds to a paging device perform the following steps:

Step	Action
1	On the All Controls Window select the Paging Controls button. The Paging Controls window displays.
2	Select the Setup tab. The Paging Controls Setup window displays.
3	From the Clinical Unit drop-down list, select the unit containing the beds to which you wish to assign a paging device.
4	From the Device drop-down list, select the paging device to which you wish to assign beds.
5	If desired, assign a name (for example, the name of the clinician responsible for the device) to the paging device by typing a 1- to 18-character name in the Name field.
6	Place a checkmark in the box next to the Page for Unassigned Beds field if you would like a page to be sent to this device when an alarm occurs for any unassigned beds (beds without a paging device assigned to them) in this unit. This field applies to all alarms (red, yellow or technical INOPs).
7	Place a checkmark in the Page for All Red Alarms in Unit field if you want a page to be sent to this paging device whenever a red alarm occurs for beds in this unit.

Assigning Beds/Alarms to a Paging Device

Step	Action
8	Place a checkmark in the Page for Unsilenced Red Alarms for All Beds in Unit field if you would like a page to be sent to this paging device whenever a red alarm (for <i>any</i> bed in this unit) is not acknowledged within a pre-configured amount of time.
9	Specify the types of alarms (red, yellow, INOPs) that will generate a page to this paging device by placing a checkmark next to the appropriate alarm type in the Alert field.
10	Specify which alarm types (red, yellow, INOPs) will generate an additional page being sent to this paging device whenever an alarm for beds <i>assigned</i> to this paging device are not acknowledged within a pre-configured amount of time.
11	To assign all beds in the selected unit to the paging device put a checkmark in the box next to the unit name in the Beds field.
12	To assign specific beds to the paging device place a checkmark in the box next to the bed label in the Beds field.
13	When you are done making changes select the OK button. Selecting the Cancel button cancels changes and returns the window to the state it was in upon entry.

Sending Manual Pages

Overview

For systems with the paging option available, you can initiate a manual page from the Information Center by selecting the **Page** button from Fast Alarm window.

The Fast Alarm window allows you to send pages, for alarms currently set up to receive pages, to all paging devices currently assigned to this bed. When you select the **Page** button an alarm page is sent out to all pagers currently assigned to this bed and that type of alarm.

Task Summary

To manually send a page from the Fast Alarm window perform the following steps:

Step	Action
1	Select the alarm for which you want to send a page by placing your cursor over the alarm/INOP condition message area in the appropriate patient sector then selecting the alarm or INOP from the drop-down list. The Fast Alarm window displays.
2	Select the Page button to send a page to the paging device(s) assigned to this bed.

Sending Text Messages

Overview For systems with the paging option available, you can use the Patient Window to send a text message to one or more paging devices.

Task Summary To send a text message to a paging device(s) perform the following steps:

Step	Action
1	On the All Controls Window select the Patient Window button. The Patient Window displays.
2	Select the Page button. The Manual Page window displays.
3	Select the paging devices to which you wish to send a page by placing a checkmark in the box next to the device name. If you would like to send a page to all the paging devices in a unit place a checkmark in the box next to the unit name.
4	Inside the text box and type a message of up to 250 characters.
5	When you are done selecting paging devices and entering text select the Send button to send the message to the selected paging devices. <i>Note</i> —Selecting the Cancel button cancels any changes and returns the Patient Window to the state it was in upon entry.

Specifying Alarms for Automatic Paging

Overview

If paging is available on your system, a third column will appear in the Record/Store Alarms window where you can specify which alarms will generate an automatic page.

Task Summary

To choose the specific alarms that will generate automatic pages perform the following steps:

Step	Action
1	On the Patient Window select the All Controls button.
2	On the All Controls Window select the Record/Store/Page button under Alarm Management and Setup. The Record/Store/Page window displays.
3	<p>Under the Page column specify which alarms will generate an automatic alarm page by clicking in, or for touch screen displays touching, the appropriate check box to the left of the alarm. A checkmark in the box selects the alarm for automatic paging. No checkmark in the Page box for an alarm does not turn off the alarm it only prevents the automatic page for an alarm from being sent to the paging device.</p> <p><i>Note</i>—You can return to the default settings for the unit by selecting the Unit Settings button.</p>
4	When you are done specifying alarms select the All Controls button to return to the All Controls window.

Viewing Paging Device/Bed Assignments

Overview

You can use the Paging Controls View window to see all the paging devices currently set up for a unit along with the beds assigned to them. The Paging Controls View window allows you to sort your view by bed label or by paging device.

When you view by bed label the Paging Controls View window displays all the beds currently assigned to a unit along with the paging devices assigned to those beds.

When you view by paging device the Paging Controls View window displays a list of the paging devices set up for a unit along with the current alarms set up to generate a page to a paging device.

View by Device Task Summary

View by paging device by performing the following steps:

Step	Action
1	On the Patient Window select the Paging Controls button. The Paging Controls View window displays.
2	Select Device from the View drop-down menu in the upper left-side of the window.
3	View the paging devices set up for a clinical unit by selecting the + sign next to the desired unit. A list of paging devices set up for this unit displays below the unit name along with an icon to left of each paging device name indicating the paging device type (for example, a pager, cell phone or marquee display).
4	View the beds currently assigned to a paging device by highlighting the paging device name from the list on the left. A list of the beds assigned to this device displays on the right-side of the window.

Step	Action																
5	<p>View the current alarms set up to generate a page by selecting the + sign next to the desired paging device name. A colored box displays next to the Alerts and Unsilenced Alerts field indicating the types of alerts and unsilenced alerts that will generate a page to the device.</p> <table> <tr> <th>This Box</th><th>Indicates</th></tr> <tr> <td>Empty Box</td><td>No alarm or INOPs are set up to generate a page to this device.</td></tr> <tr> <td>Red Box</td><td>Red alarms for beds assigned to this paging device are set up generate a page to this device.</td></tr> <tr> <td>Cyan Box</td><td>INOP alarms for beds assigned to this paging device are set up to generate a page to this device.</td></tr> <tr> <td>Red/Yellow</td><td>Red and yellow alarms for beds assigned to this paging device are set up to generate a page to this device.</td></tr> <tr> <td>Red/Cyan</td><td>Red and INOP alarms for beds assigned to this paging device are set up to generate a page to this device.</td></tr> <tr> <td>Red/Yellow/Cyan</td><td>Red, yellow and INOP alarms for beds assigned to this paging device are set up to generate a page to this device</td></tr> <tr> <td>Yellow/Cyan</td><td>Yellow and INOP alarms for beds assigned to this paging device are set up to generate a page to this device.</td></tr> </table>	This Box	Indicates	Empty Box	No alarm or INOPs are set up to generate a page to this device.	Red Box	Red alarms for beds assigned to this paging device are set up generate a page to this device.	Cyan Box	INOP alarms for beds assigned to this paging device are set up to generate a page to this device.	Red/Yellow	Red and yellow alarms for beds assigned to this paging device are set up to generate a page to this device.	Red/Cyan	Red and INOP alarms for beds assigned to this paging device are set up to generate a page to this device.	Red/Yellow/Cyan	Red, yellow and INOP alarms for beds assigned to this paging device are set up to generate a page to this device	Yellow/Cyan	Yellow and INOP alarms for beds assigned to this paging device are set up to generate a page to this device.
This Box	Indicates																
Empty Box	No alarm or INOPs are set up to generate a page to this device.																
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Cyan Box	INOP alarms for beds assigned to this paging device are set up to generate a page to this device.																
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Yellow/Cyan	Yellow and INOP alarms for beds assigned to this paging device are set up to generate a page to this device.																

Step	Action
6	Print a report of all the paging devices in the clinical unit along with the beds assigned to those devices and the alarms set up to generate a page to the device select the Print button.
7	When you are done viewing the paging settings for a clinical unit select the All Controls button to return to the All Controls window.

View by Bed Label Task Summary

View by bed label by performing the following steps:

Step	Action
1	On the Patient Window select the Paging Controls button. The Paging Controls View window displays.
2	Select Bed Label from the View drop-down menu in the upper left-side of the window.
3	View the bed labels currently assigned to a clinical unit by selecting the + sign next to the desired unit. A list of bed labels for below the unit name. Any bed label in blue indicates that this bed is currently not being monitored.
4	View the paging devices currently assigned to a particular bed select the + sign next bed label. A list of paging devices currently assigned to this displays along with an icon to left of the paging device name indicating the paging device type (for example, a pager, cell phone or marquee display). <i>Note</i> —You can view all the beds currently assigned to a paging device by highlighting the paging device name from the list on the left. A list of all the beds currently assigned to this device on the right-side of the window.

Step	Action																
5	<p>View the current alarms set up to generate a page by selecting the + sign next to the desired paging device name. A colored box displays next to the Alerts and Unsilenced Alerts field indicating the types of alerts and unsilenced alerts that will generate a page to the device.</p> <table> <tr> <th>This Box</th><th>Indicates</th></tr> <tr> <td>Empty Box</td><td>No alarm or INOPs are set up to generate a page to this device.</td></tr> <tr> <td>Red Box</td><td>Red alarms for beds assigned to this paging device are set up to generate a page to this device.</td></tr> <tr> <td>Cyan Box</td><td>INOP alarms for beds assigned to this paging device are set up to generate a page to this device.</td></tr> <tr> <td>Red/Yellow</td><td>Red and yellow alarms for beds assigned to this paging device are set up to generate a page to this device.</td></tr> <tr> <td>Red/Cyan</td><td>Red and INOP alarms for beds assigned to this paging device are set up to generate a page to this device.</td></tr> <tr> <td>Red/Yellow/Cyan</td><td>Red, yellow and INOP alarms for beds assigned to this paging device are set up to generate a page to this device</td></tr> <tr> <td>Yellow/Cyan</td><td>Yellow and INOP alarms for beds assigned to this paging device are set up to generate a page to this device.</td></tr> </table>	This Box	Indicates	Empty Box	No alarm or INOPs are set up to generate a page to this device.	Red Box	Red alarms for beds assigned to this paging device are set up to generate a page to this device.	Cyan Box	INOP alarms for beds assigned to this paging device are set up to generate a page to this device.	Red/Yellow	Red and yellow alarms for beds assigned to this paging device are set up to generate a page to this device.	Red/Cyan	Red and INOP alarms for beds assigned to this paging device are set up to generate a page to this device.	Red/Yellow/Cyan	Red, yellow and INOP alarms for beds assigned to this paging device are set up to generate a page to this device	Yellow/Cyan	Yellow and INOP alarms for beds assigned to this paging device are set up to generate a page to this device.
This Box	Indicates																
Empty Box	No alarm or INOPs are set up to generate a page to this device.																
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Yellow/Cyan	Yellow and INOP alarms for beds assigned to this paging device are set up to generate a page to this device.																

Viewing Paging Device/Bed Assignments

Step	Action
6	Print a report of all the bed labels in the clinical unit along with the paging devices assigned to those beds by selecting the Print button.
7	When you are done viewing the paging settings for a clinical unit select the All Controls button to return to the All Controls window.

ST for Bedside Monitors

This chapter describes the use of ST Review for bedsides at the Information Center. For ST monitored bedside patients refer to your bedside user documentation for information on ST monitoring. For ST monitored telemetry patients refer to your telemetry user’s manual. This chapter includes the following sections:

- Overview 8-2
- Enabling ST Review for Bedside Monitors 8-5
- CANNOT ANALYZE ST INOP 8-7
- ST Data Summary 8-8

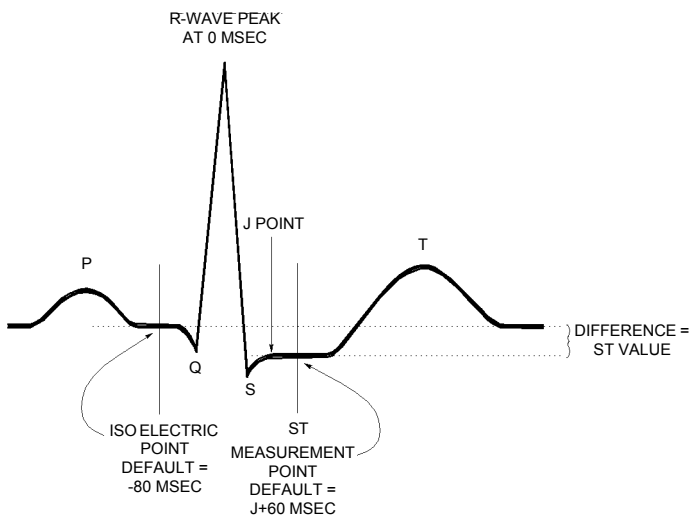
Overview

The Information Center allows you to review the ST waves and ST trends in the ST Review window for ST monitored bedside patients using ST monitoring at their bedside or are monitored in the diagnostic bandwidth at the bedside monitor. With EASI monitoring, ST analysis is performed on up to 12 leads and an additional value of ST index is calculated and displayed.

All ST analysis and ST alarms for bedside monitors will be performed by the bedside monitor. Refer to you the documentation that comes with your bedside monitor for information on setting up ST monitoring at the bedside. ST analysis at the Information Center has no impact on the analysis performed at the bedside. In addition, when using EASI monitoring at the bedside you can additionally get 12 lead ST and ST Index using the Information Center ST/AR ST algorithm. This information is for ST review and does not generate alarms.

The Measurement

The ST measurement for each beat complex is the vertical *difference* between two measurement points. The **isoelectric point** provides the baseline for the measurement and the **ST point** provides the other measurement point. It is positioned with reference to the J-point. A positive value indicates ST segment elevation; a negative value indicates depression.



Information Center's ST/AR ST Algorithm

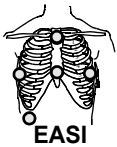
The Information Center ST/AR ST algorithm analyzes ECG signals to classify the heart beats. Only beats classified as normal or Supraventricular (atrially paced) are used to calculate ST elevations and depressions.

The ST/AR ST algorithm processing includes special ST filtering, beat selection and statistical analysis, calculation of ST segment elevations and depressions, and lead reconstruction and wave generation.

Displayed ST Data

ST data displayed in the Patient Sector and Patient Window is based on ST measurements acquired by the bedside monitor. For bedside generated data you can view ST data in ST Review, Trend Review, and Event Review windows. For Information Center generated data you can view ST data in ST Review and Trend Review.

EASI ST Analysis



The Information Center generated ST values presented in the patient sector and Patient Window for EASI derived leads is “STindx”. STindx is a summation of three ST segment measurements, using the leads that can indicate ST segment changes in the different locations of the heart:

- anterior lead V2
- lateral lead V5
- inferior lead aVF

Enabling ST Review for Bedside Monitors

Overview

The ST Setup Window allows you to turn ST Monitoring on to make data available in the ST Review window. The ST Review window displays ECG beats and ST segment values for patients monitored by bedsides. The ST Review window is for review purposes only. You would turn ST on if you are doing ST analysis at the bedside monitor.

When ST analysis is off at the bedside you can only turn ST on at the Information Center if you are using a diagnostic bandwidth setting for ECG monitoring. However, you will not have ST analysis or ST alarms unless ST monitoring is also on at the bedside monitor. You should adjust ST measurement points and ST alarms at the bedside. Refer to your bedside documentation for instructions.

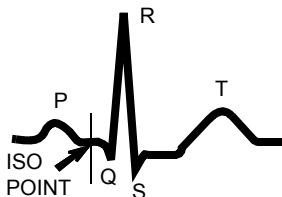
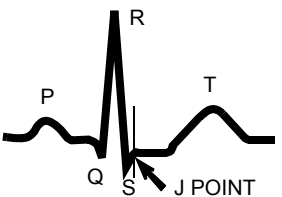
Adjusting Measurement Points

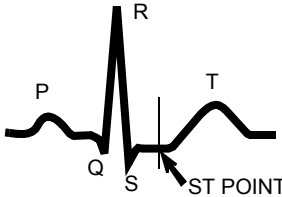
To more closely reflect how you have adjusted measurements points at the bedside monitor, the ST Setup Window allows you to turn on ST and to adjust the ST measurement points. This adjustment only effects the Information Center ST analysis it has no impact on ST analysis performed at the bedside monitor.

There are three measurement cursors:

- The ISO measurement cursor positions the isoelectric point in relation to the R-wave peak.
- The J-point cursor positions the J-point in relation to the R-wave peak. The purpose of the J-point is to correctly position the ST measurement point.
- The ST measurement cursor positions the ST point a fixed distance from the J point.

To enable and use ST Review for bedsides perform the following steps:

Step	Action
1	Turn ST monitoring on at the bedside and adjust the ST measurement points for monitoring and alarming. Refer to your bedside documentation for instructions.
2	Turn ST monitoring on at the Information Center by performing the following: a. From the All Controls window select the ST Setup button. b. From the ST Setup window select the ST On button to turn ST monitoring on at the Information Center.
3	If you need to adjust the ISO (isoelectric) point, position the bar in the middle of the flattest part of the baseline (between the P and Q waves or in front of the P wave) and use the arrow keys to make the adjustment. 
4	Adjust the J point, if necessary, by positioning the bar at the end of the QRS complex and the beginning of the ST segment. 

Step	Action
5	<p>Adjust the ST point, if necessary, by using the J point as an “anchor” so that the bar is at the midpoint of the ST segment.</p>  <p>The ST point can be set to either 0, 20, 40, 60, or 80 milliseconds from the J point. You should choose the most appropriate setting based on patient heart rate and ECG morphology.</p>
6	<p>Access the ST Review window by selecting the ST Review button on the All Controls window. The ST Review window displays. The top portion of the window contains the Information Center-generated ST snippets. The bottom portion of the window contains the bedside-generated trended ST parameter measurements along with the STindx value for EASI users.</p> <p>See “ST Review” on page 6-38 for information on using the ST Review window and establishing a ST reference beat (baseline).</p>

CANNOT ANALYZE ST INOP

The ST alarms are not generated by the Information Center they are generated by the bedside monitor. The Information Center could generate the INOP “CANNOT ANALYZE ST”. The INOP is generated when ST is turned on at the Information Center but not at the bedside and the ECG filter is not set to Diagnostic at the bedside. The calculation of STindx does not occur and the INOP CANNOT ANALYZE ST displays at both the Information Center and the bedside. Refer to your bedside user manual for information on bedside generated ST alarms.

ST Data Summary

The table below details where ST related data is available when ST is turned on at the Information Center and on at the bedside.

Data	At Information Center	At Bedside
ST measurement adjustment	Adjusts Information Center ST measurement only.	Adjusts bedside ST measurement only.
ST Alarm limit adjustment	N/A	Yes
ST Alarms	ST Alarms and INOPs are generated by the bedside are displayed at the Information Center.	ST Alarms and INOPs are generated and displayed at the bedside.
ST Parameters from Information Center	In ST Review only.	N/A
ST Parameters from bedside	Yes	Yes
STindx	Yes (EASI only)	N/A
ST Snippet Review	Reviews Information Center generated ST snippets only.	Reviews bedside generated ST snippets only.
ST parameters in Trend Review	Information Center displays both bedside ST parameters and Information Center generated STindx.	Bedside shows only bedside generated parameters.

Information Center Configuration

This chapter provides the configuration items for which you can change factory set defaults to accommodate the needs of your unit. It contains the following sections:

- Information Center Unit Settings Menus 9-2
- Arrhythmia Alarms Unit Settings 9-6
- Record/Store/Page Alarms Unit Settings 9-9
- ST Unit Settings (telemetry) 9-13
- Trend Groups Unit Settings 9-15
- Event Groups Unit Settings 9-22
- Stored Waves Unit Settings 9-26
- Scheduled Reports Unit Settings 9-28
- General Setup Unit Settings 9-36
- Volume Control Unit Settings 9-37

Information Center Unit Settings Menus

Overview

The Information Center comes with factory set defaults that govern how your system operates. You do not need to spend a lot of time setting up the system because this has been configured for you. The Information Center does, however, provide unit settings menus that contain configuration items for which you can change the factory set defaults to accommodate the needs of your unit. The Information Center provides the following unit settings menus:

Menu	Use to...
Arrhythmia Alarms Unit Settings	Change the arrhythmia alarm default settings (limits and on/off status). See “Arrhythmia Alarms Unit Settings” on page 9-6 for a list of available configuration choices.
Record/Store Alarms Unit Settings	Change the default settings for recording or storing alarms. See “If you have a basic arrhythmia capability configured, only the settings for the basic yellow alarms are applicable (see “Levels of Arrhythmia Analysis” on page 5-3).” on page 9-8 for a list of available configuration choices.
ST Unit Settings	Change the ST measurement point defaults and set all leads on or off. Change the ST alarm limit default settings and set all alarms on or off. See “ST Unit Settings (telemetry)” on page 9-13 for a list of available configuration choices.

Menu	Use to...
Trend Groups Unit Settings	Change the trend groups configured for an Information Center. You can configure up to ten trend groups per Information Center. Each group can contain up to ten parameters, presented two at a time, in trend charts. See “Trend Groups Unit Settings” on page 9-15 for a list of available configuration choices.
Event Groups Unit Settings	Change the event groups configured for an Information Center. You can configure up to ten event groups for an Information Center. See “Event Groups Unit Settings” on page 9-22 for a list of available configuration choices.
Stored Waves Unit Settings	Change the default settings for the wave(s) that are stored in Wave Review and Alarm Review. See “Stored Waves Unit Settings” on page 9-26 for a list of available configuration choices.
Scheduled Reports	Change the default settings for scheduling unit reports. See “Scheduled Reports Unit Settings” on page 9-28.
General Setup	Select the wave that appears as the 2nd wave on the resting display and to enable or disable the ability for a clinician to silence alarms from the bed-to-bed overview window at the IntelliVue Patient Monitor. See “General Setup Unit Settings” on page 9-36.
Volume Control Unit Settings	Change the default level of the alarm sound. See “Volume Control Unit Settings” on page 9-37 for configuration choices.

Menu	Use to...
Telem Freq Unit Settings	Review the current RF Frequency settings and tune in new Philips Telemetry System telemetry devices. See your <i>Philips Telemetry System Instructions for Use</i> for details.
Telemetry Setup	Use this window to configure unit-wide settings for telemetry devices in this unit. The options available to you in this window depend on whether you are using Philips Telemetry System telemetry devices or Philips IntelliVue Telemetry System telemetry devices. See your appropriate telemetry system <i>Instructions for Use</i> for details.

Accessing
the Unit
Settings
Menus

You can access any of the Information Center unit settings menus by performing the following steps:

Step	Action
1	On the Patient Window select the All Controls button.
2	On the All Controls Window select the Unit Settings button under Configuration and Support.
3	On the Unit Settings box select the button associated with the group for which you want to change settings. For example, selecting the Arrhyth Alarms button accesses the unit settings menu and settings for arrhythmia alarms or selecting the Trends Groups button displays the unit settings menu and settings for Trend Groups.
4	Enter a password in the Password field.
5	Select the OK button. The Information Center displays the unit settings menu associated with the button you selected in Step 3.

**Using the
Unit
Settings
Menus**

The Information Center unit settings menus provide the following options to assist you in using the menus:

Option	Description
Store Settings	Select this button to save any changes you make to configuration settings.
Factory Defaults	Select this button to display factory set defaults.
Unit Settings	Select this button to display the current settings for an Information Center.
New Group	This option is available for the Trend Groups and Event Groups Unit Settings menus. Use this option to add a new group. You can configure up to ten trend or event groups for an Information Center. If the maximum of ten has been reached you need to delete a group before adding a new one.
Delete Group	This option is available for the Trend Groups and Event Groups Unit Settings menus. Use this option to delete a group for an Information Center.

In general, changes you make to the unit settings do not take effect on currently monitored patients but will take effect once the patient is discharged. Changes made to the unit settings for Trend Groups, Event Groups, Telemetry Setup (standby duration), Telemetry Frequency and Volume Control take effect immediately for all monitored patients.

**Printing the
Unit
Settings**

If the Print button is enabled on the Unit Settings windows, you can print a report of the settings for that window (if a printer is available).

Arrhythmia Alarms Unit Settings

Alarms Page 1

Item	Default	Choices	User Choice
HR High Limit	Adult: 120 b/min Pediatric: 160 b/min Neonatal: 200 b/min	20 to 300 b/min	
HR Low Limit	Adult: 50 b/min Pediatric: 75 b/min Neonatal: 100 b/min	15 to 295 b/min	
Smart HR Limits at Patient Connection	Off	On or Off	
<i>Note</i> —this item automatically assigns HR Smart Limits (see page 4-35)			
<i>Inside the Unit Settings</i>			
High Smart Limit is HR	+20 b/min	0 to +50 b/min	
<i>Note</i> —See page 4-35.			
Low Smart Limit is HR	-20 b/min	0 to -50 b/min	
<i>Note</i> —See page 4-35.			
<i>Outside the Unit Settings</i>			
High Smart Limit is HR	0 b/min	0 to +50 b/min	
<i>Note</i> —See page 4-35.			
Low Smart Limit is HR	0 b/min	0 to -50 b/min	
Timeout Period, first level	3 min	0, 1, 2, 3, 4, 5 min	

Item	Default	Choices	User Choice
Timeout Period, second level	10 min	0, 1, 2, 3, 4, 5, 10, 15 min	
Analysis Mode	Multi-lead	Multiple Lead Single lead Arrhythmia Off	
Asystole >=	Adult/Pedi: 4 sec Neonate: 3 Sec	2.5 - 4 sec in 0.5 sec. intervals	
V-Tach HR	Adult: 100 b/min Pediatric: 120 b/min Neonatal: 150 b/min	20 to 300 b/min	
V-Tach >=	5 PVCs	3 to 99 PVCs	
Extreme Tachy Difference	20 b/min	0 to 50 b/min	
Extreme Tachy Max	Adult: 200 b/min Pediatric: 220 b/min Neonatal: 240 b/min	150 to 300 b/min	
Extreme Brady Difference	20 b/min	0 to 50 b/min	
Extreme Brady Min	Adult: 40 b/min Pediatric: 40 b/min Neonatal: 50 b/min	15 to 100 b/min	
Alarm Reminder - Red	On	On or Off	
Alarm Reminder - Yellow	On	On or Off	
INOP Reminder	On	On or Off	
Latched - Yellow	On		
Note —This item applies to IntelliVue Telemetry System bedside yellow non-arrhythmia telemetry alarms only.			

Alarms Page 2

Note—If you have a basic arrhythmia capability configured, only the settings for the basic yellow alarms are applicable (see “Levels of Arrhythmia Analysis” on page 5-3).

Item	Default	Choices	User Choice
Non-Sustain VT	On	On or Off	
Vent Rhythm	On >14 PVCs	On or Off 2 to 99 PVC	
Run PVCs	On	On or Off	
Pair PVCs	On	On or Off	
R-On-T PVC	On	On or Off	
Vent Bigeminy	On	On or Off	
Vent Trigeminy	On	On or Off	
PVC Rate	On Adult: >10 PVCs/min Pediatric: >5 PVCs/min Neonatal: >5 PVCs/min	On or Off 1 to 99 PVCs/min	
Multiform PVC	On	On or Off	
Pacer Not Capture	On	On or Off	
Pacer Not Pace	On	On or Off	
Pause >	On Adult/Pedi: 2.0 sec Neonate: 1.5 sec	On or Off 1.5 - 2.5 in 0.25 sec. intervals	
Missed Beat	On	On or Off	

Item	Default	Choices	User Choice
SVT	On Adult: ≥ 180 b/min Pediatric: ≥ 200 b/min Neonatal: ≥ 210 b/min	On or Off 20 to 300 b/min	
SVT Run >	On 5 SVs	On or Off 3 to 99 SVs	
Irregular HR	On	On or Off	
Some ECG Alrms Off INOP	On	On or Off	

Record/Store/Page Alarms Unit Settings

Note—If paging is available on your system, a third column displays in the Record/Store/Page Alarms Unit Settings window where you can specify the alarms which will generate an automatic page for a patient. If paging is not available on your system the Page column does not display in this window.

Red Alarms

Item	Default	Choices	User Choice
Asystole	Store: On Record: On Page: On	Record: On or Off Page: On or Off	Record: Page:
V-fib/tach	Store: On Record: On Page: On	Record: On or Off Page: On or Off	Record: Page:

Record/Store/Page Alarms Unit Settings

Item	Default	Choices	User Choice
V-tach	Store: On Record: On Page: On	Record: On or Off Page: On or Off	Record: Page:
Extreme Tachy	Store: On Record: On Page: On	Record: On or Off Page: On or Off	Record: Page:
Extreme Brady	Store: On Record: On Page: On	Record: On or Off Page: On or Off	Record: Page:
All Red Non-Arrh.	Store: On Record: On Page: On	Record: On or Off (If Off, no recordings are generated, regardless of the bedside setting. If On, only the alarms set to be recorded by the bedside will generate recordings.) Page: On or Off	Record: Page:

Yellow Alarms

If you have basic arrhythmia capability configured, the settings for the basic yellow alarms are applicable (refer to “Levels of Arrhythmia Analysis” on page 5-3).

Item	Default	Choices	User Choice
HR	Store: On Record: On Page: On	Store: On or Off Record: On or Off Page: On or Off	Store: Record: Page:
Non-Sustain VT	Store: On Record: On Page: On	Store: On or Off Record: On or Off Page: On or Off	Store: Record: Page:
Vent Rhythm	Store: On Record: On Page: On	Store: On or Off Record: On or Off Page: On or Off	Store: Record: Page:

Item	Default	Choices	User Choice
Run PVCs	Store: On Record: On Page: On	Store: On or Off Record: On or Off Page: On or Off	Store: Record: Page:
Pair PVCs	Store: On Record: On Page: On	Store: On or Off Record: On or Off Page: On or Off	Store: Record: Page:
R-On-T PVC	Store: On Record: On Page: On	Store: On or Off Record: On or Off Page: On or Off	Store: Record: Page:
Vent Bigeminy	Store: On Record: On Page: On	Store: On or Off Record: On or Off Page: On or Off	Store: Record: Page:
Vent Trigeminy	Store: On Record: On Page: On	Store: On or Off Record: On or Off Page: On or Off	Store: Record: Page:
All Yellow Non-Arrh. <i>Note</i> —If Record is Off, no recordings are generated, regardless of the bedside/telemetry setting. If On, only the alarms set to be recorded by the bedside/telemetry will generate recordings	Store: On Record: On Page: On	Store: On or Off Record: On or Off Page: On or Off	Store: Record: Page:
PVC Rate	Store: On Record: On Page: On	Store: On or Off Record: On or Off Page: On or Off	Store: Record: Page:
Multiform PVC	Store: On Record: On Page: On	Store: On or Off Record: On or Off Page: On or Off	Store: Record: Page:

Record/Store/Page Alarms Unit Settings

Item	Default	Choices	User Choice
Pacer Not Capture	Store: On Record: On Page: On	Store: On or Off Record: On or Off Page: On or Off	Store: Record: Page:
Pacer Not Pace	Store: On Record: On Page: On	Store: On or Off Record: On or Off Page: On or Off	Store: Record: Page:
Missed Beat	Store: On Record: On Page: On	Store: On or Off Record: On or Off Page: On or Off	Store: Record: Page:
Pause	Store: On Record: On Page: On	Store: On or Off Record: On or Off Page: On or Off	Store: Record: Page:
SVT	Store: On Record: On Page: On	Store: On or Off Record: On or Off Page: On or Off	Store: Record: Page:
Irregular HR	Store: On Record: On Page: On	Store: On or Off Record: On or Off Page: On or Off	Store: Record: Page:
All ST Alarms	Store: On Record: On Page: On	Store: On or Off Record: On or Off Page: On or Off	Store: Record: Page:

ST Unit Settings (telemetry)

Item	Default	Choices	User Choice
Alarms/Leads/Parameters			
ST Alarms On	On	On or Off	
ST On	Off	On or Off	
Smart Limits at Patient Connection	Off	On or Off	
ST Point -Selection	J + 60	J + 60, J + 80	
ST Default Alarm Limit Settings			
Singlelead High	2.0 mm	-19.8 to 20.0 mm	
Singlelead Low	-2.0 mm	-20.0 to 19.8 mm	
Multilead High	1.0 mm	-19.8 to 20.0 mm	
Multilead Low	-1.0 mm	-20.0 to 19.8 mm	
ST Smart Alarm Limit Settings			
<i>Inside the Unit Settings</i>			
Singlelead High ST	+1.0 mm	0.0 to +4.0	
Singlelead Low ST	-1.0 mm	0.0 to -4.0	
Multilead High ST	+1.0 mm	0.0 to+ 4.0	
Multilead Low ST	-1.0 mm	0.0 to -4.0	

ST Unit Settings (telemetry)

Item	Default	Choices	User Choice
<i>Outside the Unit Settings</i>			
Singlelead High ST +	0.0 mm	0.0 to + 4.0	
Singlelead Low ST	0.0 mm	0.0 to -4.0	
Multilead High ST +	0.0 mm	0.0 to + 4.0	
Multilead Low ST	0.0 mm	0.0 to -4.0	

Trend Groups Unit Settings

The list on the next pages contains the parameter choices for trend group configuration. This list is followed by a table that provides the factory set defaults. See Appendix A, “Trend Definitions” for definitions of the Trend Parameters.

None	% BIGEMINY	P2 SYS
HR	BIS	P3
NBP	CCO	P3 DIAS
%SpO ₂ ¹	CO	P3 MEAN
RESP	CPP	P3 SYS
ABP	DiffT	P4
PVC Rate	dSPO2	P4 DIAS
PAP	EtCO2	P4 MEAN
CVP	FAP	P4 SYS
T1	FAP DIAS	% PACED
Tblood	FAP MEAN	PACED BEAT COUNT
ABP DIAS	FAP SYS	PACED RATE
ABP MEAN	FIO2	PACED RATE MAX
ABP SYS	HR-Pls	PACED RATE MIN
ALL BEAT COUNT	IC1	PACED RUN COUNT
Ao	IC2	PACER NOT CAPTURE COUNT
Ao DIAS	ICP	PACER NOT PACED COUNT
Ao MEAN	IMCO2	PAP DIAS
Ao SYS	% IRREGULAR HR	PAP MEAN
ART	IUP	PAP SYS
ART DIAS	LAP	PAUSE COUNT
ART MEAN	MAX PVC RUN	PAWP
ART SYS	MULTIFORM COUNT	PIP
% ATRIAL PACED	NBP DIAS	pNN50 ⁵
ATRIAL PACED BEAT COUNT	NBP MEAN	% POOR SIGNAL
AUX	NBP SYS	PULSE
% AV PACED	NN SD ⁴	PulseT
AV PACED BEAT COUNT	NORMAL BEAT COUNT	PVC COUNT
AWF	P1	PVC PAIR COUNT
AWP	P1 DIAS	PVC RUN COUNT
AWRR	P1 MEAN	R-ON-T COUNT
BAP	P1 SYS	RAP
BAP DIAS	P2	S-S RATE
BAP MEAN	P2 DIAS	S-S RATE MAX
BAP SYS	P2 MEAN	S-S RATE MIN

Trend Groups Unit Settings

SaO2	ST-V9	Tcore
Sp-vO2	ST: aVL, I, aVR	tcpCO2
SpO2 l	ST: aVR, aVL, aVF	tcpO2
SpO2 r	ST: I, aVL, V	Tesoph
%SpO2, %SpO2T, %SpO2T ²	ST: I, II, III	Tnaso
%SpO2T, %SpO2T	ST: I, II, III, aVR, aVL, aVF	Trect
ST-aVF	ST: II, aVF, III	% TRIGEMINY
ST-aVL	ST: II, aVF, V	Tskin
ST-aVR	ST: V, MCL	Ttymp
ST-I	ST: V1, V2, V3 ³	TV
ST-II	ST: V1, V2, V3, V, MCL ³	Tven
ST-III	ST: V3R, V4R, V5R	Tvesic
ST-MCL	ST: V4, V5, V6 ³	UAP
ST-V	ST: V7, V8, V9	UAP DIAS
ST-V1	Stindx ³	UAP MEAN
ST-V2	SV COUNT	UAP SYS
ST-V3	SvO2	UVP
ST-V3R	SVPB COUNT	V-V RATE
ST-V4	SVPB RUN COUNT	V-V RATE MAX
ST-V4R	T2	V-V RATE MIN
ST-V5	T3	V? RUN COUNT
ST-V5R	T4	% VENT PACED
ST-V6	Tamb	VENT PACED BEAT COUNT
ST-V7	Tart	
ST-V8	Tcereb	

¹The first setting can be either continuous SpO2 monitoring (bedside monitors or telemetry) or intermittent SpO2 monitoring (telemetry only). The second setting is for telemetry only.

²The left parameter is continuous SpO2 monitoring (bedside monitors or telemetry), and the right parameter is intermittent SpO2 monitoring (telemetry only).

³Available only with EASI ECG capability.

⁴Standard Deviation of NN RR intervals where RR intervals are less than 4 seconds.

⁵A measure of Heart Rate Variability (HRV); Percent of NNN beat sequences with changes of R_R intervals greater than 50 msec.

The following trends are available for patients monitored by M3 bedside monitors:

HR	P2 (M4 only)	ST-I
PULSE	P2 SYS (M4 only)	ST-II
RESP	P2 DIAS (M4 only)	ST-III
%SpO2	P2 MEAN (M4 only)	ST-aVL
ABP	ART	ST-aVF
ABP SYS	ART SYS	ST-aVR
ABP DIAS	ART DIAS	ST-V
ABP MEAN	ART MEAN	ST-MCL
PAP	Ao	ST: I, II, III, aVR, aVL, aVF
PAP SYS	Ao SYS	ST: I, II, III
PAP DIAS	Ao DIAS	ST: II, aVF, V
PAP MEAN	Ao MEAN	ST: I, aVL, V
PAWP	ICP	ST: V, MCL
CVP	CPP (M4 only)	ST: aVR, aVL, aVF
NBP	LAP	ST: II, III, aVF
NBP SYS	RAP	ST: aVL, I, aVR
NBP DIAS	IUP	ST: II, aVF, III
NBP MEAN	UAP	
P1	UAP SYS	
P1 SYS	UAP DIAS	
P1DIAS	UAP MEAN	
P1 MEAN	UVP	

Trend Groups Unit Settings

Item	Default	User Choice
VITAL SIGNS	Left Parameter HR %SPO2, %SPO2, %SPO2T ABP PAP T1 Right Parameter NBP RESP None CVP Tblood	
ARRHYTHMIA	Left Parameter HR PVC COUNT PVC RUN COUNT IRREGULAR HR % PACED Right Parameter % POOR SIGNAL None None None None	

Item	Default	User Choice
ST CHANGES	Left Parameter STindx ST: II,aVF,III ST: V1,V2,V3,V,MCL ST: V4,V5,V6 ST: aVL,I,aVR Right Parameter HR None None None None	
PACED	Left Parameter HR % PACED % VENT PACED % ATRIAL PACED % AV PACED Right Parameter None None None None None	

Trend Groups Unit Settings

Item	Default	User Choice
RESPIRATORY	Left Parameter HR %SpO2 EtCO2 RESP TV Right Parameter None None None AWRR FIO2	
HEMO	Left Parameter HR ABP PAP CO CVP Right Parameter None NBP PAWP SVO2 LAP	

Item	Default	User Choice
RR IRREGULARITY	Left Parameter HR pNN50 NN SD % IRREGULAR HR % POOR SIGNAL Right Parameter None None None None None	

Event Groups Unit Settings

The following is a list of parameter choices for event group configuration. The table on page 9-24 provides a list of factory set defaults. Only the first two events can be viewed for patients monitored by M3 bedside monitors.

ARRHYTHMIA OFF, ALL ARRH ALRMS OFF, and ALARMS SUSPENDED or ALARMS PAUSED trigger the ALARMS OFF event.

Note—Slow is defined as <60 b/min, Fast is >120 b/min, Run is ≥ 2 beats, Long>8.0 seconds.

None	VFIB/TACH EVENT	** RESP HIGH
SOME ECG ALRMS OFF	* IRREGULAR HR	** ST I HIGH
ALARMS OFF	PATIENT BUTTON	** ST I LOW
PAIR V EVENT	YLW ALARMS	** ST II HIGH
RUN V EVENT	ARRHY EVENT	** ST II LOW
FAST RUN V EVENT	ALL ALARMS	** ST III HIGH
LONG RUN V EVENT	ARRHY ALARMS	** ST III LOW
PAIR V? EVENT	RED ARRHY ALARMS	** ST aVF HIGH
RUN V? EVENT	YLW ARRHY ALARMS	** ST aVF LOW
FAST RUN V? EVENT	BED ALARMS	** ST aVL HIGH
LONG RUN V? EVENT	RED BED ALARMS	** ST aVL LOW
RUN P EVENT	YLW BED ALARMS	** ST aVR HIGH
FAST RUN P EVENT	ST ALARMS (Tel)	** ST aVR LOW
FAST LONG RUN P	*** ASYSTOLE	** ST V HIGH
SLOW RUN P EVENT	*** VFIB/VTACH	** ST V LOW
SLOW LONG RUN P	*** V-TACH	** ST MCL HIGH
RUN SVPB EVENT	*** EXTREME BRADY	** ST MCL LOW
FAST RUN SVPB EVENT	*** EXTREME TACHY	** PULSE HIGH
MISSED BEAT EVENT	* NON SUSTAIN VT	** PULSE LOW
PACER NOT CAPTURE EVENT	* VENT RHYTHM	** P1 HIGH
PACER NOT PACED EVENT	* PAIR PVCs	** P1 LOW
R-ON-T PVC EVENT	* R-ON-T PVC	** PAP WEDGE
MULTIFORM PVC EVENT	* MULTIFORM PVCs	** P2 HIGH
VENT RHYTHM EVENT	* PACER NOT CAPT	** P2 LOW
PAIR SVPB EVENT	* PACER NOT PACE	** P3 HIGH
USER SAVED STRIPS	* MISSED BEAT	** P3 LOW
VENT BIGEMINY EVENT	* SVT	** P4 HIGH
VENT TRIGEMINY EVENT	* HR HIGH	** P4 LOW
ASYSTOLE EVENT	* HR LOW	** ABP HIGH
	** RESP LOW	** ABP LOW

** CVP HIGH	*** ABP DISCONNECT	** Tart LOW
** CVP LOW	*** CVP DISCONNECT	** Tven HIGH
** LAP HIGH	*** LAP DISCONNECT	** Tven LOW
** LAP LOW	*** PAP DISCONNECT	** ST V1 HIGH
** PAP HIGH	*** ICP DISCONNECT	** ST V1 LOW
** PAP LOW	*** IUP DISCONNECT	** ST V2 HIGH
** ICP HIGH	*** NBP DISCONNECT	** ST V2 LOW
** ICP LOW	*** ART DISCONNECT	** ST V3 HIGH
** IUP HIGH	** T1 HIGH	** ST V3 LOW
** IUP LOW	** T1 LOW	** ST V4 HIGH
** NBP HIGH	** T2 HIGH	** ST V4 LOW
** NBP LOW	** T2 LOW	** ST V5 HIGH
** ART HIGH	** IMCO2 HIGH	** ST V5 LOW
** ART LOW	*** RAP DISCONNECT	** ST V6 HIGH
** RAP HIGH	*** Ao DISCONNECT	** ST V6 LOW
** RAP LOW	** VUELINK/OTHER ALARM	** MULTI-ST
** Ao HIGH	* RUN PVCs	PAUSE EVENT
** Ao LOW	** SPO2 LOW	* PAUSE
*** APNEA	** SPO2 HIGH	** BIS LOW
** AWRR HIGH	** SVO2 LOW	** BIS HIGH
** AWRR LOW	** SVO2 HIGH	** CCO LOW
** EtCO2 LOW	* VENT BIGEMINY	** CCO HIGH
** EtCO2 HIGH	* VENT TRIGEMINY	*** DESAT
** tcpCO2 LOW	* PVC RATE	
** tcpCO2 HIGH	IRREGULAR HR EVENT	
** tcpO2 LOW	** UVP HIGH	
** tcpO2 HIGH	** UVP LOW	
** FIO2 LOW	*** UAP DISCONNECT	
** FIO2 HIGH	** UAP HIGH	
** PLETH LOW	** UAP LOW	
** PLETH HIGH	*** UVP DISCONNECT	
** CPP HIGH	** Trect HIGH	
** CPP LOW	** Trect LOW	
** BLOODT HIGH	** Tcore HIGH	
** BLOODT LOW	** Tcore LOW	
*** VENTILATOR DISCONNECT	** Tskin HIGH	
*** VENTILATOR FAILURE	** Tskin LOW	
** HEATING PWR	** Tesoph HIGH	
*** P1 DISCONNECT	** Tesoph LOW	
*** P2 DISCONNECT	** Tnaso HIGH	
*** P3 DISCONNECT	** Tnaso LOW	
*** P4 DISCONNECT	** Tart HIGH	

Event Groups Unit Settings

The following alarm events are NOT available for patients monitored by M3 bedside monitors:

***all invasive pressure DISCONNECT except P1, P2, ABP, ART, and Ao

**P3 and **P4

**HEATING PWR

**tcpCO2 and **tcpCO2

**IUP and **CPP

**T2

**FIO2

**PAP WEDGE

**VUELINK/OTHER ALARM

**PLETH

**BLOODT

**SVO2

**IMCO2

***VENTILATOR DISCONNECT

**MULTI ST

**BIS

***VENTILATOR FAILURE

**EtCO2

**PAUSE

***P2 DISCONNECT and **PAP WEDGE are available for patients on M4 monitors.

Item	Default	User Choice
LIFE THREATENING	***ASYSTOLE ***V-FIB/TACH ***EXTREME TACHY ***EXTREME BRADY ***V-TACH	
DYSRHYTHMIAS	FAST RUN V EVENT FAST RUN SVPB EVENT *PVC RATE MISSED BEAT EVENT VENT RHYTHM EVENT	
VENTRICULAR ALARMS	***V-TACH *NON SUSTAIN VT *RUN PVCs *PAIR PVCs *R-ON-T PVC	
DISCHARGE	*HR HIGH *HR LOW *SpO2 LOW *NBP LOW *PVC RATE	

PACER INSERTION	*HR LOW **NBP LOW *MISSED BEAT *PVC RATE IRREGULAR HR EVENT	
Item	Default	User Choice
PACED	*HR HIGH *HR LOW *MISSED BEAT *PACER NOT PACE *PACER NOT CAPT	
ALL ALARMS	RED ARRHY ALARMS YLW ARRHY ALARMS BED ALARMS ALARMS OFF NONE	

Stored Waves Unit Settings

The following is a list of parameter choices for Wave Review/saved strips, and the stored waves for alarms. The table below provides a list of set defaults.

None	PLETHl	P4	BAP
PRIMARY WAVE*	PLETHr	ABP	ART
SECONDARY WAVE*	PlethT	CVP	RAP
ECG1	CO2	LAP	Ao
ECG2	AWP	PAP	UAP
ECG3	AWF	ICP	UVP
ECG4	P1	IC1	EEG
RESP	P2	IC2	EEG1
PLETH	P3	FAP	EEG2

*Tracks the primary and secondary waves selected at the bedside or, for telemetry, on the Patient Window.

Note—The following waves from VueLink modules are not stored: IMCO2, FIO2, etN2O, inN2O, etAGT, inAGT, O2, AGENT

Continuous Waves page

The waves selected will be the default waves saved in full disclosure (Wave Review) and in strips saved to Alarm Review from Wave Review, Event Review.

Item	Default	User Choice
Wave Selection 1	PRIMARY WAVE	
Wave Selection 2	SECONDARY WAVE	
Wave Selection 3	ECG2	
Wave Selection 4	RESP	

Note—If PRIMARY or SECONDARY is a wave in one of the other selections, that wave is only stored once.

Alarm Waves page

The waves selected will be the default waves for alarms stored in Alarm Review and the action of the patient sector button (if configured).

Item	Default	User Choice
Wave Selection 1	PRIMARY WAVE	
Wave Selection 2	SECONDARY WAVE	
Wave Selection 3	ECG2	
Wave Selection 4	RESP	

Note—If Primary or Secondary is a wave in one of the other selections, that wave is only stored once.

Scheduled Reports Unit Settings

Overview

The Scheduled Report Unit Settings menus allow you to set up and scheduled reports that will print on a regular basis for all admitted patients in the unit. From the Scheduled Reports Unit Settings window you can change the settings for the following reports by selecting the appropriate tab on the top of the window:

- All Reports
- Trend Report
- Alarm Report
- Event Report
- Wave Report
- Summary Report

Note—You can print reports for specific patients on demand or set up the reports to print on a regularly scheduled basis for a particular patient by selecting **Scheduled Reports** from the All Controls window. Patients must be admitted before you can setup and schedule the reports. See Chapter 6, Patient Data Review, in your *Information Center Instructions for Use* for information for setting up and printing reports for a specific patient.

Printing Behaviors

Reports are printed according to the time specified in the All Reports Unit Settings Window (see “All Reports” on page 9-29). However, the following general printing behaviors apply:

- If there are a large number of reports to be printed at the same time, some reports may be printed a few minutes ‘late’.
- If the printer is not available at the scheduled time (for example if there are other print jobs in the queue or there is a printer problem, etcetera.) then the Information Center will periodically re-try to print the reports. If the ‘next’ scheduled time arrives and the first scheduled report still has not been successfully printed, then the first report is deleted and the next report is printed.

- When the time is set back to accommodate daylight savings time, the subsequent scheduled report will contain an extra hour to cover the time period. When time is set forward, the same period of time may be covered in two reports (for example, a one hour scheduled report would print twice with the same data once labeled as 1:00 am and again labeled as 2:00 am).
- Scheduled reports will start on the nearest time interval that occurs after a report scheduled for printing. For example, if at 2:15 pm, scheduled reports are configured to start at 8:00 am with a frequency of once every 4 hours, then a scheduled reports will start being produced at 4:00 pm the same day.

All Reports

Use the All Reports Unit Settings window to specify one or more reports to be printed on a regularly scheduled basis for the all the admitted patients in this unit. All reports for one patient are printed sequentially followed by the next patient.

Reports are sorted by bed label.

Step	Action
1	Select the reports by selecting the checkbox next to the report name. A checkmark in the checkbox selects the report for printing.
2	<p>Indicate the time for which you want reports to start by specifying the time in the Start Time field. Specify the hour by clicking on or, for touch screen displays, touching the hour in the Start Time then using the up and down arrows until the desired time displays. Specify the minutes by clicking on or, for touch screen displays, touching the minutes in the Start Time then using the up and down arrows until the desired minutes display. Minutes are specified in 15 minute increments. Reports will be printed per the time you specify in the Start Time field. However, if there are a large number of reports to be printed at the same time, some reports may be printed a few minutes 'late'.</p> <p><i>Note</i>—You can also specify start time by clicking on or touching the hour or minutes then typing the time using the keyboard.</p>

Step	Action
3	<p>Indicate how often you want the reports to occur by selecting a time from the Frequency drop-down box. Choice are:</p> <ul style="list-style-type: none">• Every Hour• Every 2 Hours• Every 6 Hours• Every 8 Hours (default)• Every 12 Hours• Every 24 Hours <p><i>Note</i>—The amount of data that the reports will contain depends on the time Frequency you specify here. For example, if the time frequency is 8 hours the reports you select in Step 1 will only show data for the previous 8 hours.</p>
4	<p>Select the Store Settings button to store any changes made in this window and set the unit defaults.</p>

**Trend
Report Unit
Settings**

The amount of data that the Trend Report will contain depends on the time Frequency specified in the All Reports Unit Settings window. For example, if the time frequency is 8 hours the report will only show data for the previous 8 hours.

Perform the following steps to set up the Trend Reports unit setting:

Step	Action
1	<p>Specify the maximum number of pages this report should contain by selecting the number of pages from the Maximum Pages (default is 5) drop-down list. When you specify a specific number of pages the report will stop when that number of pages is reached regardless of whether there is more data or not.</p>
2	<p>Select the trend group for this report from the Trend Group (default is VITAL SIGNS) drop-down list.</p>

Step	Action
3	<p>Specify whether you want the report to print in tabular (default) or graphical format by selecting the appropriate Report Type radio button.</p> <p>Select Tabular if you want to print the trend data in rows and columns suitable for charting purposes. The tabular Trend Report contains:</p> <ul style="list-style-type: none"> • Time labeled columns • Parameter label for each row • Parameter average value for each trend corresponding to time column (aperiodic values show as the latest value for that column) • Date and time of time cursor at top of display • Highlighted row indicating time cursor. <p>Select Graphic Trend if you want to print the report with the 5 graphic trends from the Trend Group. The graphic Trend Report contains:</p> <ul style="list-style-type: none"> • Parameter label(s) for each trend line • Parameter value(s) for each trend corresponding to current time cursor position • Date and time of time cursor at top of display • Vertical line time cursor indicator • Parameter scale indicators (same as scale on display at time of print request) • Time line
4	<p>For tabular reports specify the trend interval by selecting the time from the Trend Interval (default is 60 Minutes) drop-down list.</p>
5	<p>Select the Store Settings button to store any changes made in this window and set the unit defaults.</p>
6	<p>If you would like to print the unit Trend Reports now select Print Report Now button.</p>

**Alarm
Report Unit
Settings**

The amount of data that the Alarm Report will contain depends on the time frequency specified in the All Reports Unit Settings window. For example, if the time frequency is 8 hours the report will only show data for the previous 8 hours.

Perform the following steps to set the Alarm Reports unit settings:

Step	Action
1	Specify the maximum number of pages this report should contain by selecting the number of pages from the Maximum Pages drop-down list (default is 5). When you specify a specific number of pages the report will stop when that number of pages is reached regardless of whether there is more data or not.
2	Select the alarm group for this report from the Alarm Group drop-down list (default is ALL ALARMS).
3	Specify whether you want an alarm report or strip report (default) by selecting on the appropriate Report Type radio button.
4	Select the Store Settings button to store any changes made in this window and set the unit defaults.
5	If you would like to print the unit Alarm Reports now select Print Report Now button.

Event Report Unit Settings

The Event Summary Report contains:

- A graphic trend of HR for the most recent 24 hours.
- A graphic trend of PVC for the most recent 24 hours.
- A tabular trend for HR (max, median, min) for the most recent 24 hours.
- A tabular trend of event counts for each of the event group entries for the displayed event group for the most recent 24 hours.
- An event strip containing the event specification and duration for each entry in the Summary Report.

Perform the following steps set the Event Summary Reports unit settings:

Step	Action
1	Specify the maximum number of pages this report should contain by selecting the number of pages from the Maximum Pages (default is 5) drop-down list. When you specify a specific number of pages the report will stop when that number of pages is reached regardless of whether there is more data or not.
2	Select the event group for this report from the Event Group drop-down list (default is LIFE THREATENING). The report will print all events configured for the event group you specify.
3	Select the Store Settings button to store any changes made in this window and set the unit defaults.
4	If you would like to print the unit Event Reports now select Print Report Now button.

**Wave
Report Unit
Settings**

Perform the following steps to set up the Wave Report unit settings:

Step	Action
1	Specify the maximum number of pages this report should contain by selecting the number of pages from the Maximum Pages (default is 5) drop-down list. When you specify a specific number of pages the report will stop when that number of pages is reached regardless of whether there is more data or not.
2	<p>Specify whether you want a wave report, a strip report (default) or a 12 lead report by selecting on the appropriate Report Type radio button.</p> <p>Wave Report prints a compressed full disclosure wave report. The waves that the report will contain depend on the waves selected in the Wave Report Settings field and whether waves have been stored for the given time interval.</p> <p>Strip Report prints a periodic sample of the full disclosure waves for this patient. The waves that appear depend on what was stored for the specified time interval. The time between each strip on the report is determined by the time specified in the Strip Interval field. Each strip is approximately 6 seconds.</p> <p>Twelve Lead prints a report of the EASI wave data stored for this patient. This report is a single page report containing a single 12-lead derivation of the EASI waves for this patient at time of the report.</p>
3	If you selected Wave Report in Step 2, specify the waves (1 to 4) to be included in the report by selecting the appropriate checkbox(s) in the Wave Report Settings field. The waves available here correspond to the waves selected in the Stored Waves window.
4	If you selected Wave Report in Step 2, indicate the number of minutes of waves to compress per page by selecting the minutes from the Minutes per Page drop-down list.

Step	Action
5	If you selected Strip Report in Step 2, indicate what the time interval between strips should be by selecting a time from the Strip Interval drop-down list.
6	Select the Store Settings button to store any changes made in this window and set the unit defaults.
7	If you would like to print the Wave Report now select the Print Report Now button.

Summary Report Unit Settings

Use the Summary Report window to set up and print either an individual patient reports or a unit report for all patients currently admitted and assigned to this Information Center.

Perform the following steps to set up Summary Report unit settings:

Step	Action
1	Specify whether the summary reports will be Patient Reports or a Unit Reports (default) by selecting the appropriate radio button in the Report Type field.
2	For Unit Reports specify whether to print the report in Compact format or One Page Per Patient format by selecting the appropriate radio button in the Unit Report Settings field. In Compact format, the report does not include the wave sample and all patient information is packed into the fewest number of pages. In One Page Per Patient format the wave sample is included and each patient report appears on a single page.
3	Select the Store Settings button to store any changes made in this window and set the unit defaults.
4	If you would like to print the Summary Report now select the Print Report Now button.

General Setup Unit Settings

Item	Default	Choices	User Choices
Secondary Wave		The waves available for selection are the waves that may be sourced for telemetry bedsides, IntelliVue Patient Monitors and M3.	
<i>Note</i> —Use this field to select the wave that appears as the 2nd wave on the resting display.			
Silence Overview Alarms at Bedside	On	On or Off	
<i>Note</i> —Use this field to enable or disable the ability for a clinician to silence alarms in the bed-to-bed overview window on the IntelliVue Patient Monitor. When the Silence button is selected at the IntelliVue Patient Monitor it silences all active alarms at the Information Center for the bed that is currently being overviewed. This field applies to all overviewed beds.			
Warning			
Enables the remote Silence key in the Overview window for IntelliVue monitors connected to this Information Center. This may enable remote silencing for these beds in other clinical units.			

Volume Control Unit Settings

Item	Default	Choices	User Choices
Current Volume	6	1 to 10, with 10 being the loudest.	
<i>Note</i> —Use this field to adjust the alarm tone volume.			
Test Volume While Setting	On	On or Off	Not applicable -- is used in this window only, and does not affect the Volume Control Window.
Unit Settings	Default: 6 Minimum: 4	1 to 10, with 10 being the loudest.	
<i>Note</i> —The Minimum volume is the quietest that a user can adjust the volume in the Volume Control Window. <i>Important</i> —Be sure the minimum setting is still audible in your care unit -- in some environments, a setting of 1 is barely audible.			

Information Center Safety and Specifications

This chapter provides information on Information Center safety and specifications. It includes the following sections:

- Regulatory and Safety Specifications 10-2
- Information Center Software Specifications. 10-5
- M3150/55 Information Center 10-6
- M3151 Information Center Client 10-7
- M3170 Patient Link 10-8
- M3154 Database Server 10-9
- M3169 Small Database Server 10-10
- Release F.0 Hardware Performance Requirements 10-11
- ECG Performance Disclosure/Specifications. 10-16
- Specifications for the Philips M1116B 2-Channel Recorder 10-19
- Specifications for the M3160A 4-Channel Recorder 10-21
- Installation Information 10-22
- Explanation of Symbols 10-24
- During Power Transitions/Loss 10-26
- If Connection to the M3154/M3169 Database Server is Lost 10-27
- Maintenance 10-29
- Cleaning 10-30

Regulatory and Safety Specifications

Declaration



The M3290A Information Center Software Release F.0 complies with the requirements of the Council Directive 93/42/EEC of 14 June 1993 concerning medical devices and carries CE-marking accordingly.

The Information Center Software complies with the applicable portion of ANSI/AAMI EC-13.

The PC Workstation and UPS comply with IEC 60950 or IEC 62040-1-1:2004 or UL 1778 3rd Edition/CSA C22.2 No 107.3, CISPR 22 Level A, and CISPR 24. They carry CE-marking to the European Low Voltage Directive (73/23/EEC) and EMC Directive (89/336/EEC). They are not suitable for installation in the Patient Care Vicinity (Patient Environment).

Note—The display is not provided as part of the Information Center. Displays are ordered separately.

For specifications on the Philips Recorder, see “Specifications for the Philips M1116B 2-Channel Recorder” on page 10-19 “Specifications for the M3160A 4-Channel Recorder” on page 10-21.

Authorized EU Representative

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D 71034, Boeblingen
Germany

Electromagnetic Compatibility

Medical electrical equipment can either generate or receive electromagnetic interference. This product has been evaluated for electromagnetic compatibility (EMC) with the appropriate accessories according to IEC 60601-1-2:2001, the international standard for EMC for medical electrical equipment. This IEC standard has been adopted in the European Union as the European Norm, EN 60601-1-2:2001.

Radio frequency (RF) interference from nearby transmitting devices can degrade performance of the product. Electromagnetic compatibility with surrounding devices should be assessed prior to using the product.

Fixed, portable, and mobile radio frequency communications equipment can also affect the performance of medical equipment. See your service provider for assistance with the minimum recommended separation distance between RF communications equipment and the product.

The cables, sensors/transducers, and other accessories for which compliance is claimed are listed in the Service and User documentation accompanying the product.

Warning

The use of accessories, transducers and cables other than those specified in the product service and user documentation can result in increased emissions or decreased immunity of the product.

Warning

The product should not be used next to or stacked with other equipment. If you must stack the product, you must check that normal operation is possible in the necessary configuration before the product is used.

Reducing Electro-magnetic Interference

The product and associated accessories can be susceptible to interference from other RF energy sources and continuous, repetitive, power line bursts. Examples of other sources of RF interference are other medical electrical devices, cellular products, information technology equipment, and radio/television transmission. If interference is encountered, as demonstrated by artifact on the ECG or dramatic variations in physiological parameter measurement values, attempt to locate the source. Assess the following:

- Is the interference due to misplaced or poorly applied electrodes or sensors? If so, re-apply electrodes and sensors correctly according to directions in the product's *Instructions for Use*.
- Is the interference intermittent or constant?
- Does the interference occur only in certain locations?
- Does the interference occur only when in close proximity to certain medical electrical equipment?
- Do parameter measurement values change dramatically when the AC line cord of the suspected interfering device is unplugged?

Once the source is located, attempt to attenuate the interference by distancing the product from the source as much as possible. If assistance is needed, contact your local service representative.

Restrictions for Use

Artifact on ECG and other physiological waveforms caused by electromagnetic interference should be evaluated by a physician or physician authorized personnel to determine if it will negatively impact patient diagnosis or treatment.

Information Center Software Specifications

Display

- Up to 16 patient sectors, with up to 24 waveforms per screen single or dual displays. Up to 32 waves can be displayed on dual displays with two main screens.
- Sweep speed is 25 mm/s and 12.5 mm/s depending on configuration.
- Display formats are:
 - 4 patients — 4 x 1, 2 x 2
 - 6 patients — 6 x 1, 3 x 2
 - 8 patients — 8 x 1, 4 x 2
 - 10 patients — 5 x 2
 - 12 patients — 6 x 2
 - 16 patients — 8 x 2
- Waveforms are 3.3 seconds in length in a dual-column format and 7.0 seconds in length in a single-column format (at 25 mm/s speed -- waves at 12.5 mm/s are twice as long).
- Number of waves in Patient Window: up to 4 (single display); up to 11 (dual display).
- Number of parameters in Patient Window: up to 12

Note—Philips Medical Systems (or its designees) will not install or support displays not supplied by Philips Medical Systems with Information Center purchases and cannot guarantee their compliance with ANSI/AAMI EC-13 (ECG Aspect Ratio or 25mm/s specifications), or the EMC Directive.

M3150/55 Information Center

Features

The M3150/55 Information Center provides real-time waveform monitoring and alarms at a Information Center location for up to 16 patients. The standard M3150/55 Information Center includes the following features:

- Windows XP Workstation, keyboard, and mouse.
- Philips 2-channel Recorder.
- UPS.
- Displays up to 16 patients.
- Up to 32 waves on a main screen.
- Configurable resting display.
- Audio alarm annunciation.
- ST/AR enhanced multi-lead ST segment and arrhythmia analysis.
- If not connected to M3154 or M3169 Database Server: stores 50 30-second alarm/strip records, up to 4 waves per record; if connected to M3154 or M3169 Database Server: database stores 150 alarm/strip records, up to 4 waves per record.
- 24 hours of wave review storage, up to 4 waves per patient.
- 24 hour trends, events, and ST review.
- 24 hour EASI 12-lead full disclosure
- Philips Monitoring Network (SDN) connectivity and Philips IntelliVue Clinical Network connectivity.

Options

Options for the M3150/45/55 Information Center include:

- Web access via the hospital's internet/intranet.
- Second display capability for full screen Patient Window and application window, or 2 main screens.
- If not connected to M3154 Database Server: storage for 150 thirty-second alarm and saved strip records, up to 4 waves per record (50 is standard).
- 48/72/96 hour wave review, event review, trend review and ST review storage, up to 4 waves per patient.
- 48/72/96 hour EASI Full Disclosure
- Alert Data Integration
- Export Data to Holter System
- 12-Lead Analysis/Export
- Remote slave display(s).
- Several display sizes are available.
- Touch screen flat panel display.

- Up to three strip chart recorders.
- Trackball.
- Laser printer printed reports.

Important—If the remote slave display is a different size from the main display, the slave display will not meet the 25 mm/s sweep speed specification. See the *Philips Information Center Service Manual*.

M3151 Information Center Client

Features

The Information Center Client provides real-time waveform monitoring at a hallway location for up to 16 patients being monitored by a primary Information Center on the IntelliVue Clinical Network system. The standard M3151 Information Center Client includes the following features:

- Windows XP Workstation, keyboard, and mouse.
- Philips 2-channel Recorder.
- UPS.
- Displays up to 16 patients who are monitored by an Information Center on the IntelliVue Clinical Network.
- Up to 32 waves on a main screen.
- Configurable resting display.
- Alarm silencing (if Full Control access).
- Accesses real-time waveforms and parameters; accesses data stored by the Database Server.
- Configurable Full Control, Read-Only, or No access to patient data controls.
- IntelliVue Clinical Network connectivity.

Options

Options for the M3151 Information Center Client include:

- Second display capability for full screen Patient Window and application window, or 2 main screens.
- Several display sizes are available.
- Trackball.
- Laser printer printed reports.
- Up to three strip chart 2-channel recorders.

Important—If the remote slave display is a different size from the main display, the slave display will not meet the 25 mm/s sweep speed specification. See the *Philips IntelliVue Information Center Service Manual* for more information.

M3170 Patient Link

Features

The M3170 IntelliVue Patient Link Information Center operate as a standalone Information Center without a display. The M3170 IntelliVue Patient Link Information Center provide a central location for bedside recordings and reports initiated from SDN hardwired bedsides, M2/3/4 bedsides and IntelliVue Patient Monitors. In addition, the Patient Link provides support for bed to bed overview and alarm reflection for M3/4 and IntelliVue Patient Monitors. The M3170 IntelliVue Patient Link Information Center is not for use with telemetry bedsides.

M3170 Patient Link provides no accessibility to clinical applications, no bedside remote control for Information Center arrhythmia functions, and no storage of Information Center generated alarms. The M3170 Patient Link does not generate alert sounds and relies on the bedside monitor for visual and auditory alarm notification. The standard M3170 Information Center includes the following features:

- Windows XP Workstation.
- Philips 2-channel Recorder.
- UPS.
- Up to 16 patients.
- Philips Monitoring Network (SDN) connectivity and Philips IntelliVue Clinical Network connectivity.

Options

Options for the M3170 Information Center include:

- Laser printer printed reports.
- Up to three strip chart 2-channel recorders.

M3154 Database Server

Features

The M3154 Database Server provides database storage for the IntelliVue Clinical Network. Patient monitoring data from all Information Centers on the IntelliVue Clinical Network are received and stored by the Server. Any Information Center and Client on the IntelliVue Clinical Network can access stored data for any patient for review (unless configured for no access). The M3154 Database Server includes the following features:

- Server with CD-ROM and diskdrive, external modem, keyboard, and mouse.
- Windows 2000 server operating system software.
- Philips application software.
- UPS.
- Up to 8 Information Centers and up to 8 Information Center Clients per IntelliVue Clinical Network.
- Up to 8 LaserJet printers per IntelliVue Clinical Network.
- Up to 128 patients per IntelliVue Clinical Network.
- 32 transfer patients per IntelliVue Clinical Network.
- Stores up to 96 hours of monitoring data for each patient, with 4 waves per record, accessible at connected Information Centers in Wave Review, Trend Review, Event Review, and ST Review.
- 150 30-second alarm records and saved strips, accessible at connected Information Centers in Alarm Review.
- Patient data is stored on the Database Server until patient discharge. Data may be transferred from unit to unit within one Database Server or data may be transferred across Database Servers in a Large Network Database Server System.

Options

Options for the M3154 Database Server include:

- Patient Data Transfer/Web access via the hospital's internet/intranet.
- 96-hours of data storage (24 hours is standard).
- Export Data to Holter System
- Multiple switch configurations

M3169 Small Database Server

Features

The M3169 Small Database Server provides database storage for the IntelliVue Clinical Network. Patient monitoring data from all Information Centers on the IntelliVue Clinical Network are received and stored by the Server. Any Information Center and Client on the IntelliVue Clinical Network can access stored data for any patient for review (unless configured for no access). The M3169 Database Server includes the following features:

- Server with CD-ROM and diskdrive, keyboard, and mouse.
- Windows XP workstation.
- Philips application software.
- UPS.
- Up to 3 Information Centers and up to 3 Information Center Clients per IntelliVue Clinical Network.
- Up to 4 LaserJet printers per IntelliVue Clinical Network.
- Up to 48 patients per IntelliVue Clinical Network.
- Stores up to 48 hours of monitoring data for each patient, with 4 waves per record, accessible at connected Information Centers in Wave Review, Trend Review, Event Review, and ST Review.
- 150 30-second alarm records and saved strips, accessible at connected Information Centers in Alarm Review.

Options

Options for the M3169 Database Server include:

- Web access via the hospital's internet/intranet.
- 48-hours of data storage (24 hours is standard).
- 12-Lead Analysis/Export
- Multiple switch configurations

Release F.0 Hardware Performance Requirements

The Information Center software is designed to operate on qualified hardware components that are standard computer products. These include equipment from both Philips Medical Systems and equipment purchased by suppliers other than Philips Medical Systems.

The tables below list components that comprise an Information Center along with features and requirements for proper operation of the Information Center software. These requirements are not exhaustive and are primarily intended to indicate the types of features that are required for successful Information Center software performance.

Note—Components provided by Philips Medical Systems with Information Center purchases have been extensively tested and validated for system performance. Software (e.g., BIOS, drivers, service packs) not supplied by Philips Medical Systems as part an Information Center system are not approved or supported by Philips Medical Systems for use with the Information Center and IntelliVue Clinical Network/Database Server systems.

System Component	Archetypical Performance Requirements
System	Meet IEC 60950 requirements for ITE equipment
	CE-marking to the Low Voltage Directive (LVD) and EMC Directive

System Component	Archetypical Performance Requirements
Workstation	Compatible with IBM (86) type PC
	Qualified with MicroSoft Windows XP Professional™
	866 MHz Intel® Pentium® III
	384 MB RAM (M3150, M3155, M3170) 192 MB RAM (M3151)
	20 GB hard disk drive
	40x CD ROM drive operational vertically and horizontally
	Video adapter for 1280x1024, 256 color video @ 60 Hz non-interlaced refresh rate
	Configurable up to 2 simultaneous display outputs
	802.3 network controller with 10Base-T with RJ45 connector
	16 bit. wav file compatible audio with power of at least 1.0 watts RMS, 4 ohms
	External audio output (external controls not permitting 0 audio volume)
	3 PCI slots (SDN/Recorder-Interface, audio and 2nd Ethernet
	1 Parallel printer interface
	2 Serial interfaces
	3.5" floppy disk drive
	Requires less than 150W and 200VA as configured

System Component	Archetypical Performance Requirements
M3154 Database Server	Qualified with MicroSoft Windows 2000™ Server
	400+ MHz Pentium II
	512 MB of ECC (error correcting) RAM
	10+ GB RAID-5 disk drive(s) (depends on configuration)
	4x CD ROM drive
	Video adapter for 1280x1024, 256 color video @ 60 Hz non-interlaced refresh rate
	802.3 network controller with 10Base-T with RJ45 connector
	1 Parallel printer interface
	2 Serial interfaces
	3.5" floppy disk drive

System Component	Archetypical Performance Requirements
M3169 Database Server	Windows XP Professional
	866 MHz Intel® Pentium® III
	384 MB RAM
	20 GB disk drive, 7200 rpm
	40x CD ROM drive
	Video adapter for 1280x1024, 256 color video @ 60 Hz non-interlaced refresh rate
	802.3 network controller with 10Base-T with RJ45 connector
	1 Parallel printer interface
	2 Serial interfaces
	3.5" floppy disk drive
Keyboard	PS/2 Qwerty keyboard
Mouse	PS/2 2 button mouse
Trackball	PS/2 2 button trackball
Keyboard/Mouse Switch	PS/2 compatible

System Component	Archetypical Performance Requirements
Medium Color Flat Panel Display Medium CRT Color Video Display Medium Touch Flat Panel Display Large Color Flat-panel Display Large CRT Color Video Display Large Touch Flat Panel Display	1280x1024 60Hz non-interlaced capability
	Less than 15% total linearity error
	Viewable width of 1280 dots: <ul style="list-style-type: none"> • Medium Display: 308 mm • Large Display: 381 mm
	Red, Green, & Blue Video Inputs: -0.7 V p-p
	Vertical & Horizontal Multi-Sync Inputs: 5 V TTL
	Video-Cable Connector: HD 15 Male
Video Splitter	300 MHz bandwidth (1280x1024, 60 Hz video)
Speaker	Unpowered stand alone speaker
	Shielded for use with video display monitors
	6m cable compatible with PU audio output
Printer (HP LaserJet 2300 printer or higher recommended)	8 pages per minute
	Parallel/IntelliVue Clinical Network interface
	250 sheet paper capability
External Modem	57600 baud capability
Uninterruptible Power Supply	Compatible with Workstation/Server Processing Unit
	Minimum capacity of 600VA, 250W / 1000VA, 670W
	Holdup time of 5 minutes for 50% load
	Able to report low battery condition and receive shutdown command from computer's serial port

ECG Performance Disclosure/Specifications

Characteristic	Performance Disclosure/Specification (in <i>italics</i>)
Heart Rate Averaging Method	Two different methods are used: a. Normally, heart rate is computed by averaging the 12 most recent RR intervals. b. If each of 3 consecutive RR intervals are greater than 1200 milliseconds (i.e. rate less than 50 b/min) for adult and pediatric patients and greater than 750 milliseconds (i.e., rate less than 80 b/min for neonatal patients, then the 4 most recent RR intervals are averaged to compute the HR.
Heart Rate Meter Accuracy and Response to Irregular Rhythm	Provides correct heart rates (80, 60, 120, 90 b/min) using test waveforms as indicated in ANSI/AAMI EC13 Sec. 3. 1. 2. 1 (5).
Response Time of Heart Rate Meter to Change in Heart Rate	For a rate increase, the average time to reach the specified heart rate using test waveforms as indicated in ANSI/AAMI EC13 Sec. 3. 1. 2. 1 (6) is 8.6 seconds. For a rate drop, the average time is 8.2 seconds.
Time to Alarm for Tachycardia	The ranges of time to alarm using test waveforms as indicated in ANSI/AAMI EC13 Sec. 3. 1. 2. 1 (7) are 6.4 to 9.3 seconds.
Pacemaker Pulse Rejection Capability	Rejects pace pulses using test waveforms as indicated in ANSI/AAMI EC13 Sec. 3. 1. 4 (with amplitude from +/- 2 to +/- 700 mV, width from 0.1 to 2.0 ms).

Characteristic	Performance Disclosure/Specification (in italics)
Range and Accuracy of Heart Rate Meter	Meets the ANSI/AAMI EC13 Section 3.2.7 recommended minimum range and accuracy. Heart rate range is 15 - 300 b/min with accuracy of $\pm 1\%$ of the range for Adult and Pediatric patients. Heart rate range for Neonates is 15 - 350 with accuracy of $\pm 1\%$ of the range. (Note: for rates equal to or less than 15, the displayed heart rate is 0).
Alarm Limit Range	Meets the ANSI/AAMI EC13 Section 3.2.8.1 standard. Lower alarm limit is 15 -295. Upper alarm limit is 20 - 300.
Resolution of Alarm Limit Settings	Meets the ANSI/AAMI EC13 Section 3.2.8.2 standard. The resolution is ± 5 b/min.
Alarm Limit Accuracy	Meets the ANSI/AAMI EC13 Section 3.2.8.3 standard. Error less than $\pm 10\%$ or ± 5 b/min
Time to Alarm for Cardiac Standstill	Meets the ANSI/AAMI EC13 Section 3.2.8.4 standard: maximum alarm time <10 seconds, using the test waveforms as indicated.
Time to Alarm for Low Heart Rate	Meets the ANSI/AAMI EC13 Section 3.2.8.5 standard: maximum alarm time <10 seconds, using the test waveforms as indicated.
Time to Alarm for High Heart Rate	Meets the ANSI/AAMI EC13 Section 3.2.8.6 standard: maximum alarm time <10 seconds, using the test waveforms as indicated.
Alarm Silencing	The time required for reactivation of a latched, silenced alarm is 3 minutes
ECG Waveform Display Time Base Accuracy	0.8%. <i>Meets the ANSI/AAMI EC13 Section 3.2.9.6 standard: maximum error = +/-10%.</i>
Channel Width	40 mm. <i>Meets the ANSI/AAMI EC13 Section 3.2.9.7(a) standard: minimum = 30mm.</i>

Characteristic	Performance Disclosure/Specification (in italics)
Trace Width	0.3 mm. <i>Meets the ANSI/AAMI EC13 Section 3.2.9.7(b) standard: maximum = 1.0mm.</i>
Aspect Ratio	0.4s/mV. <i>Meets the ANSI/AAMI EC13 Section 3.2.9.7(f) standard: 0.4s/mV.</i>
Input Signal Reproduction Accuracy: Overall Error	-2.9%. <i>Meets the ANSI/AAMI EC13 Section 3.2.9.8(a) standard: maximum = +/- 20%.</i>
Frequency Response: Sinusoidal	0.67 to 40 Hz (3 db down). <i>Meets the ANSI/AAMI EC13 Section 3.2.9.8(b) standard: 0.67 to 40 Hz (3 db down).</i>
Frequency Response: Triangular	0 to 25% reduction. <i>Meets the ANSI/AAMI EC13 Section 3.2.9.8(b) standard: 0 to 25% reduction.</i>
Impulse Response: (for waves marked with ST bandwidth)	Displacement = 0.08 mV, slope = 0.11 mV/s. <i>Meets the ANSI/AAMI EC13 Section 3.2.9.8(c) standard: displacement maximum = 0.1 mV; slope maximum = 0.30 mV/s.</i>
Pacemaker Pulse Display Capability	Minimum = 0.2 mV RTI. <i>Meets the ANSI/AAMI EC13 Section 3.2.9. 12 standard: minimum = 0.2 mV RTI.</i>

Specifications for the Philips M1116B 2-Channel Recorder



Declaration

The M1276A option 201 Philips 2-Channel Recorder complies with the requirements of the Council Directive 93/42/EEC of 14 June 1993 concerning medical devices. The Philips 2-Channel Recorder complies with IEC 60950, CISPR 22 Level A, and CISPR 24.

This device is not suitable for installation in the Patient Care Vicinity (Patient Environment).

Temperature Range

Operating: 5 to 40°C (41 to 104°F).
Storage: -10 to 70°C (-40 to 158°F).

Humidity Range (non-condensing)

15% to 80% RH at 40°C (104°F).

AC Input Power Source Requirements

The 2-Channel Recorder can be operated from an AC source of 100 to 240V AC +/- 10%, 50 to 60 Hz.

Maximum power consumption is 30W.

Specifications for the M3176C 2-Channel Recorder



Declaration

The M3176C 2-Channel Recorder complies with the requirements of the Council Directive 93/42/EEC of 14 June 1993 concerning medical devices. The Philips 2-Channel Recorder complies with IEC 60950, CISPR 22 Level A, and CISPR 24.

This device is not suitable for installation in the Patient Care Vicinity (Patient Environment).

Physical

Dimensions: (WxDxH): 14.3 cm x 14.5 cm x 11.2 cm
(5.6 in x 5.7 in x 4.4 in)

Weight: 0.19 kg (.42 lbs)

Electrical

The recorder is powered by the Universal Power Converter (UPC) or other equivalent power source. It is recommended that the recorder be connected to a Uninterruptible Power Supply (UPS).

Environmental

Operating Temperature: 0° to 50° C (32° to 122°F)

Relative Humidity: 10% to 95% (non-condensing)

Operating Altitude: up to 3,048 m (10,000 ft.)

Specifications for the M3160A 4-Channel Recorder

This device is not suitable for installation in the Patient Care Vicinity (Patient Environment).

Temperature Range

Operating: 5 to 40°C (59 to 86°F).

Humidity Range (non-condensing)

20% to 80% RH at 30°C (86°F).

AC Input Power Source Requirements

The Philips 4-Channel Recorder can be operated from an AC source of 100 to 240V AC +/- 10%, 50 to 60 Hz.

Maximum power consumption is 70W.

Installation Information

Warning

Installation and setup must be performed by an Philips Medical Systems service representative or designee.

Environment

Follow the instructions below to ensure a completely safe electrical installation. The environment where the Information Center will be used should be reasonably free from vibration, dust, corrosive or explosive gases, extremes of temperature, humidity, and so on. For a cabinet mounted installation, allow sufficient room at the front for operation and sufficient room at the rear for servicing with the cabinet access door open.

The Information Center operates within specifications at ambient temperatures between 15°C and 30°C. Allow at least 2 inches (5 cm) clearance around the instrument for proper air circulation.

Caution

The Information Center is not suitable for installation in the Patient Care Vicinity (Patient Environment).

**Archetypical
Input Power
Source
Requirements****M3150, M3151**
200 watts**Grounding
Information
Center and
Recorder**

To protect hospital personnel, the cabinets of the Information Center and the Philips Recorder must be grounded. Accordingly, the hardware is equipped with detachable 3-wire cables which ground the instrument to the power line ground (protective earth) when plugged into appropriate 3-wire receptacles. If an adequate number of 3-wire receptacles are not available, consult the hospital electrician.

Warning







Do not use a 3-wire to 2-wire adapter with this instrument.
Do not use a power strip.








Condensation

Make sure that during operation, the instrument is free of condensation. Condensation can form when equipment is moved from one building to another, thus being exposed to moisture and differences in temperature.

Explanation of Symbols

The symbols used on the Information Center and the Philips Recorder are explained below.

<u>Symbol</u>	<u>Description</u>
	Caution, consult accompanying documents.
	This icon displays next to the bed label in the Patient Sector to indicate that the patient is telemetry monitored. If the telemetry device is “docked” at TeleMon, the icon has a box around it.
	This icon displays next to the bed label in the Patient Sector to indicate that the M3 or IntelliVue Patient Monitor is connected to a wireless IntelliVue Clinical Network.
	This symbol displays next to a numeric in both the Main Screen and Patient Window to indicate that alarms are off for that parameter. If alarms are suspended/paused, this symbol displays next to all numerics.
	This icon displays in the Patient Sector to indicate that a conflict exists between patient information at the Information Center and the bedside monitor. Go to the Admit Window for this patient and resolve the conflict.
	This symbol identifies the date of manufacture.

<u>Symbol</u>	<u>Description</u>
 xxxxxx	The manufacturing batch code.
	Fragile, handle with care
	Keep dry
	Consult instructions for use
	Catalog number
	Serial number
	On/Off control

During Power Transitions/Loss

During hospital generator power transitions, an uninterruptible power supply (UPS) allows the system to continue to process and collect data. However, the display becomes blank until the transition to generator power is complete and line power is available for the display.

If power is not restored within 90 seconds, the system begins to shut down. After 120 seconds, the PC shuts down, and the UPS beeps every five to ten seconds until power is restored.

Important—If power is restored between 90 and 120 seconds, you get the message “It is now safe to turn off your computer”, select **Restart** to reboot the system. When this message is displayed, you must select **Restart**.

If power is restored after 120 seconds, the computer is automatically restarted.

If the Information Center is connected to the telemetry mainframe (and the mainframe is not connected to a UPS), following a power cycle, arrhythmia alarms are automatically ON. Therefore, any arrhythmia alarms (including HR) that had been turned off are turned back on when the mainframe is powered up.

If Connection to the M3154/M3169 Database Server is Lost

Local Database Mode

The M3154/M3169 Database Server provides database storage for Information Centers (M3150, M3151) connected to the IntelliVue Clinical Network. Server failure rarely occurs. However, in the event that access to the Database Server is lost, the following steps will take place automatically:

1. All M3150 Information Centers and M3151 Information Center Clients on the network will temporarily stop monitoring.
2. A warning message “operating on local DB” displays at the top of the screen notifying the user that the connection to the DB (Database) Server has been lost, and service should be notified.
3. The Information Centers will automatically be reconfigured to be in a “Local Database” mode.
4. Monitoring in this mode will be restored within approximately 5 minutes of the loss of the Database Server.

In Local Database mode, data cannot be retrieved or stored on the Database Server, but data will be stored on the local Information Center database. When in Local Database mode the Information Center will operate on its last known unit settings, not the last known setting for a patient.

When in Local Database mode, the following applications will *not* be available:

- Review data for overview beds.
- Admit from a hospital information system.
- Discharge with save to the transfer list (the user can save to the Transfer List locally, but this data will not be available once the server is re-connected).
- Storage to the Database Server of alarms, waves, events, trends, ST snippets.
- Event Review, Wave Review, ST Alarms, ST Setup, Unit Settings (except for Telemetry Frequency).
- Managing Patients functions (admit/discharge/sector setup) across Information Centers. Permanent changes to equipment (any assign or change equipment actions) performed while the Database Server is unavailable will be lost when access is restored. Changes to Care Groups (setup, assignment) performed while the Database Server is unavailable will be lost when access is restored.

If Connection to the M3154/M3169 Database Server is Lost

- Synchronization of time.
- Adding/changing device configuration.
- Alert Data Integration. When connection with the Database Server is lost a *** alarm indicating that the Alert Data Integration option is not available is sent to the receiving device for each bed for which the Alert Data Integration option is available. No clinical alarms are sent to or received by the Alert Data Integration receiving device.
- Export Data to Holter System.

When the server becomes available again, the following will happen:

1. On all Information Centers, in the system message area, the following message will be displayed: “To Restore Normal Operation - Press ‘Restart Network’ in Patient Window”.
2. Select the **Restart Network** button on the Patient Window.
3. Once the **Restart Network** button is selected, a box will appear with directions for restarting the network. Since restarting the network will stop all central monitoring for 3 to 5 minutes, the restart can be planned for the optimal time.
4. Any applications that were changed while the server was unavailable will revert to their previous settings. This means that any admit, discharge, or transfer setting changes or equipment changes made while in Local Database mode will not be available when the database server is restored.
5. When connection to the IntelliVue Clinical Network is restored, M3151 Information Center Clients reboot automatically.

Important—When the network is reconnected:

- All Patient Census information will be restored from the Database Server. This means that any admit, discharge, or transfer setting changes or equipment changes made while in Local Database mode will not be available when the database server is restored.
When connection to the Database Server is restored verify that all patient equipment, admit, discharge or transfer setting changes and alarm settings are accurate.
- Trend and alarm data stored while on the local database will be lost.
- All patient settings will be restored from the Database Server.
- When connection to the Database Server is restored verify that all patient equipment, admit, discharge or transfer setting changes and alarm settings are accurate.

Please see the Service Manual for more details.

Remote Diagnostics

The message “Remote diagnostics in progress - see User’s Guide” will be displayed when your system is being accessed remotely. This may cause some delay in the system response for applications utilizing the IntelliVue Clinical Network.

Maintenance

Before commencing monitoring on a patient:

- Check for any mechanical damage.
- Check all the external leads, input data connections and accessories.
- Check all the functions of the instrument which will be needed to monitor the patient, and ensure that the instrument is in good working order.

Do not use the Information Center for any monitoring procedure on a patient if you identify features which demonstrate impaired functioning of the instrument. Contact the hospital biomedical engineer, or the Philips Medical Systems service engineer.

We recommend that full performance checks be done by qualified service personnel after every repair or upgrade. See your Information Center Service Manual for additional information.

All checks which require the instrument to be opened must be made by qualified service personnel. Safety and maintenance checks can also be made by Philips Medical Systems personnel. Your local Philips Medical Systems office will be glad to give you information about service contracts.

Warning

Failure on the part of the responsible individual hospital or institution employing the use of this equipment to implement a satisfactory maintenance schedule may cause undue equipment failure and possible health hazards.

Note—At this time, Philips Medical Systems will make available on request, and in English only, component part lists, descriptions, calibration instructions or other information which will assist the user’s appropriate qualified technical personnel to repair those parts of the equipment which are classified by Philips Medical Systems to be repairable.

Cleaning

Overview

Use only the Philips-approved substances and methods listed in this chapter to clean your equipment. Warranty does not cover damage caused by using unapproved substances or methods. Philips makes no claims regarding the efficacy of the listed chemicals or methods as a means for controlling infection. Consult your hospital’s Infection Control Officer or Epidemiologist. For comprehensive details on cleaning agents and their efficacy refer to “Guidelines for Prevention of Transmission of Human Immunodeficiency Virus and Hepatitis B Virus to Health Care and Public- Safety Workers” issued by the U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, Atlanta, Georgia, February 1989. See also any local policies that apply within your hospital, and country.

Caution

If you spill liquid on the equipment or accessories, contact your service personnel or Philips service engineer.

The Information Center hardware is generally maintenance free. However, the equipment should be kept clean and dry.

Surface Cleaning

The exterior surfaces of the Information Center components should be regularly cleaned of dust, lint, and dirt. To clean equipment surfaces, use a lint-free cloth or sponge, moistened with soap and water or a dilute, non-caustic, detergent solution.

Caution

To avoid damage to the equipment:

- Do not use abrasive material, such as steel wool or silver polish.
 - Do not use Povodine, Sagrotan, or Mucocit cleaning agents or strong solvents, such as acetone.
 - Do not submerge any part of the equipment in water or other liquid.
 - Do not pour liquid onto the system during cleaning
 - Do not allow liquid to enter the equipment case
 - Do not allow any cleaner to remain on any of the equipment surfaces, wipe it off immediately.
-
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Touch
Screen
Display
Cleaning



With a touch screen display you can access patient data by pressing the screen element directly on the display. You need to disable the touch feature before cleaning the display screen.

Disable touch and clean the display by performing the following steps:

Step	Action
1	Disable touch by pressing then releasing the Alt-F5 key combination. Warning —Be careful to use the correct key combination, pressing key combinations other than Alt-F5 could result in loss of monitoring.
2	Verify that touch is off by touching the screen.
3	Clean the touch screen by applying window or glass cleaner on a soft, clean cloth then wiping the touchscreen. Never spray or apply the cleaner directly on the screen. The active area of the touchscreen is resistant to all chemicals that do not affect glass for example ammonia-based glass cleaners and vinegar. <ul style="list-style-type: none">• Do not use alcohol (methyl, ethyl or isopropyl) or any strong dissolvent.• Do not use thinner or benzene, abrasive cleaners or compressed air.• Avoid getting liquids inside your touch monitor. If liquid does get inside have a qualified service technician check it.• Do not wipe the screen with an abrasive cloth or sponge that could scratch the glass surface.
4	When you are finished cleaning the screen, re-enable touch by pressing then releasing the Alt-F5 key combination.
5	Verify that touch is enabled by touching the screen.

Trend Definitions

This appendix provides definitions of the trend parameters.

Trend Graphs	Definition	Type
None	No parameter is trended for this field	
HR	Average Heart Rate over one minute.	Line
Pulse	Average Pulse Rate over one minute.	Line
PulseT	Average Pulse Rate over one minute from telemetry	Line
HR-PIs	Difference between HR and pulse averaged over one minute	Line
RESP	Average Respiration Rate (RR) over one minute.	Line
%SpO₂	Average %SpO ₂ (oxygen saturation from pulse oximetry) over one minute. The first setting can be either continuous SpO ₂ (bedside or telemetry) or intermittent telemetry SpO ₂ .	Line
%SpO2	Average %SpO2 over one minute. The second parameter is for telemetry SpO2 only	Line
%SpO2, %SpO2	Average %SpO2 over 1 minute. The left parameter is continuous (bedside or telemetry), and the right parameter is intermittent telemetry SpO2	Line
dSpO2	Difference between 2 selected SpO2 values averaged over one minute	Line
Sp-vO2	Oxygen extraction, or difference between SpO2 and SvO2 measurements	Line
SpO2 l	Average %SpO2 over 1 minute, measured on the left side.	Line
SpO2 r	Average %SpO2 over 1 minute, measured on the right side.	Line

Trend Graphs	Definition	Type
%SpO2,%SpO2T, %SpO2T	Average %SpO2 over 1 minute. The first parameter is a continuous bedside measurement. The second parameter is aperiodic (spot check) from telemetry and the third parameter is continuous from telemetry.	Line
%SpO2T, %SpO2T	Average %SpO2 over 1 minute. The left parameter is continuous telemetry, and the right parameter is intermittent telemetry SpO2.	Line
ABP	Average value for Arterial Blood Pressure systolic, diastolic and mean pressures over one minute. Graph will contain 3 graphic trend lines.	Line
ABP SYS	Average value for Arterial Blood Pressure systolic pressure over one minute.	Line
ABP DIAS	Average value for Arterial Blood Pressure diastolic pressure over one minute.	Line
ABP MEAN	Average value for Arterial Blood Pressure mean pressure over one minute.	Line
PAP	Average value for pulmonary artery pressure systolic, diastolic and mean pressures over one minute. Graph will contain 3 graphic trend lines.	Line
PAP SYS	Average value for pulmonary artery pressure systolic pressure over one minute.	Line
PAP DIAS	Average value for pulmonary artery pressure diastolic pressure over one minute.	Line
PAP MEAN	Average value for pulmonary artery pressure mean pressure over one minute.	Line
PAWP	Aperiodic Value for pulmonary artery wedge pressure placed on graph at time of measurement	Plot pts
CO	Aperiodic Value for cardiac output placed on graph at time of measurement	Plot pts

Trend Graphs	Definition	Type
CCO	Average value for continuous cardiac output averaged over one minute.	Line
CVP	Average value for central venous pressure mean pressure over one minute.	Line
NBP	Aperiodic value for non-invasive blood pressure systolic, diastolic and mean pressures over one minute. Graph will contain 3 values for each entry.	Plot pts
NBP SYS	Aperiodic value for non-invasive blood pressure systolic pressure at time of measurement.	Line
NBP DIAS	Aperiodic value for diastolic pressure at time of measurement.	Line
NBP MEAN	Aperiodic value for mean pressure at time of measurement.	Plot pts
P1	Average value for pressure 1 systolic, diastolic and mean pressures over one minute. Graph will contain 3 graphic trend lines.	Line
P 1 SYS	Average value for pressure 1 systolic pressure over one minute.	Line
P 1 DIAS	Average value for pressure 1 diastolic pressure over one minute.	Line
P 1 MEAN	Average value for pressure 1 mean pressure over one minute.	Line
P2	Average value for pressure 2 systolic, diastolic and mean pressures over one minute. Graph will contain 3 graphic trend lines.	Line
P 2 SYS	Average value for pressure 2 systolic pressure over one minute.	Line
P 2 DIAS	Average value for pressure 2 diastolic pressure over one minute.	Line

Trend Graphs	Definition	Type
P2 MEAN	Average value for pressure 2 mean pressure over one minute.	Line
P3	Average value for pressure 3 systolic, diastolic and mean pressures over one minute. Graph will contain 3 graphic trend lines.	Line
P 3 SYS	Average value for pressure 3 systolic pressure over one minute.	Line
P 3 DIAS	Average value for pressure 3 diastolic pressure over one minute.	Line
P 3 MEAN	Average value for pressure 3 mean pressure over one minute.	Line
P4	Average value for pressure 4 systolic, diastolic and mean pressures over one minute. Graph will contain 3 graphic trend lines.	Line
P 4 SYS	Average value for pressure 4 systolic pressure over one minute.	Line
P 4 DIAS	Average value for pressure 4 diastolic pressure over one minute.	Line
P 4 MEAN	Average value for pressure 4 mean pressure over one minute.	Line
ART	Average value for arterial pressure systolic, diastolic and mean pressures over one minute. Graph will contain 3 graphic trend lines.	Line
ART SYS	Average value for arterial pressure systolic pressure over one minute.	Line
ART DIAS	Average value for arterial pressure diastolic pressure over one minute.	Line
ART MEAN	Average value for arterial pressure mean pressure over one minute.	Line

Trend Graphs	Definition	Type
Ao	Average value for aortic systolic, diastolic and mean pressures over one minute. Graph will contain 3 graphic trend lines.	Line
Ao SYS	Average value for aortic systolic pressure over one minute.	Line
Ao DIAS	Average value for aortic pressure diastolic pressure over one minute.	Line
Ao MEAN	Average value for aortic mean pressure over one minute.	Line
BAP	Average value for brachial arterial systolic, diastolic and mean pressures over one minute. Graph will contain 3 graphic trend lines.	Line
BAP SYS	Average value for brachial arterial pressure systolic over one minute.	Line
BAP DIAS	Average value for brachial arterial pressure diastolic over one minute.	Line
BAP MEAN	Average value for brachial arterial pressure mean over one minute.	Line
FAP	Average value for femoral arterial systolic, diastolic and mean pressures over one minute. Graph will contain 3 graphic trend lines.	Line
FAP SYS	Average value for femoral arterial pressure systolic over one minute.	Line
FAP DIAS	Average value for femoral arterial pressure diastolic over one minute.	Line
FAP MEAN	Average value for femoral arterial pressure mean over one minute.	Line
ICP	Average value for intracranial pressure mean over one minute.	Line
IC1	Average value for intracranial pressure mean 1 over one minute.	Line

Trend Graphs	Definition	Type
IC2	Average value for intracranial pressure mean 2 over one minute.	Line
CPP	Average value for cerebral perfusion pressure over one minute.	Line
LAP	Average value for left atrial pressure mean over one minute.	Line
RAP	Average value for right atrial mean pressure over one minute.	Line
IUP	Average value for inter-uterine pressure mean over one minute.	Line
UAP	Average value for umbilical artery pressure systolic, diastolic and mean pressures over one minute. Graph will contain 3 graphic trend lines.	Line
UAP SYS	Average value for umbilical pressure systolic pressure over one minute.	Line
UAP DIAS	Average value for umbilical pressure diastolic pressure over one minute.	Line
UAP MEAN	Average value for umbilical pressure mean pressure over one minute.	Line
UVP	Average value for umbilical venous pressure mean pressure over one minute.	Line
ST-I	Average of four – 15 second ST segment values.	Line
ST-II	Average of four – 15 second ST segment values.	Line
ST-III	Average of four – 15 second ST segment values.	Line
ST-aVL	Average of four – 15 second ST segment values.	Line
ST-aVF	Average of four – 15 second ST segment values.	Line
ST-aVR	Average of four – 15 second ST segment values.	Line

Trend Graphs	Definition	Type
ST-V1	Average of four – 15 second ST segment values. (EASI ECG Only)	Line
ST-V2	Average of four – 15 second ST segment values. (EASI ECG Only)	Line
ST-V3	Average of four – 15 second ST segment values. (EASI ECG Only)	Line
ST-V3R	Average of four – 15 second ST segment values. (EASI ECG Only)	Line
ST-V4	Average of four – 15 second ST segment values. (EASI ECG Only)	Line
ST-V4R	Average of four – 15 second ST segment values. (EASI ECG Only)	Line
ST-V5	Average of four – 15 second ST segment values. (EASI ECG Only)	Line
ST-V5R	Average of four – 15 second ST segment values. (EASI ECG Only)	Line
ST-V6	Average of four – 15 second ST segment values. (EASI ECG Only)	Line
ST-V7	Average of four – 15 second ST segment values. (EASI ECG Only)	Line
ST-V8	Average of four – 15 second ST segment values. (EASI ECG Only)	Line
ST-V9	Average of four – 15 second ST segment values. (EASI ECG Only)	Line
ST-V	Average of four – 15 second ST segment values.	Line
ST-index	Average of four – 15 second ST segment values. (EASI ECG Only). ST-index is the sum of the absolute value of ST-AvF, ST-V2 and ST-V5.	Line

Trend Graphs	Definition	Type
ST-MCL	Average of four – 15 second ST segment values.	Line
ST-I, II, III, aVR, aVL, aVF	Average of four – 15 second ST segment values. Produces 6 line graphs.	Line
ST-I, II, III	Average of four – 15 second ST segment values. Produces 3 line graphs.	Line
ST-II, aVF, V	Average of four – 15 second ST segment values. Produces 3 line graphs.	Line
ST-I, aVL, V	Average of four – 15 second ST segment values. Produces 3 line graphs.	Line
ST-V, MCL	Average of four – 15 second ST segment values. Produces 2 line graphs.	Line
ST-aVR, aVL, aVF	Average of four – 15 second ST segment values. Produces 3 line graphs.	Line
ST-V1, V2, V3	Average of four – 15 second ST segment values. Produces 3 line graphs. (EASI ECG Only)	Line
ST-II, III, aVF	Average of four – 15 second ST segment values. Produces 3 line graphs.	Line
ST-V3R, V4R, V5R	Average of four - 15 second ST segment values. Produces 3 line graphs. (EASI ECG Only)	Line
ST-V4, V5, V6	Average of four – 15 second ST segment values. Produces 3 line graphs. (EASI ECG Only)	Line
ST-V7, V8, V9	Average of four - 15 second ST segment values. Produces 3 line graphs. (EASI ECG Only)	Line
ST-aVL, I, aVR	Average of four - 15 second ST segment values. Produces 3 line graphs.	Line
ST-II, aVF, III	Average of four - 15 second ST segment values. Produces 3 line graphs.	Line

Trend Graphs	Definition	Type
ST-V1, V2, V3, V, MCL	Average of four - 15 second ST segment values. Produces 3 line graphs. (EASI ECG Only)	Line
PVC Count	Total number of beats labeled “V” in one minute.	Bar
SV Count	Total number of beats labelled “S” and “N” in one minute.	Bar
SVPB Count	Total number of beats labelled “S” in one minute.	Bar
Pause Count	Total number of asystole, pause, missed beat events in one minute.	Bar
Paced Beat Count	Total number of “P” beat labels (paced beats) in one minute.	Bar
PVC Pair Count	Total number of ventricular pairs (2 V’s in a row) in one minute.	Bar
PVC Run Count	Total number of PVC runs (3 or more V’s in row) in one minute.	Bar
Paced Run Count	Total number of Paced runs (3 or more “P” in a row = run) in one minute	Bar
SVPB Run Count	Total number of SVPB runs (3 or more “S” in a row = run) in one minute	Bar
Pacer Not Capture Count	Total number of Pacer Not Capture (No QRS for 1.75 x the average R-R interval with Pace Pulse (paced patient only) in one minute.	Bar
Pacer Not Pace Count	Total number of Pacer Not Pace (No QRS and No Pace Pulse for 1.75 x the average R-R interval (paced patient only) in one minute.	Bar
R on T Count	Total number of R on Ts (For HR <100, a PVC with R-R interval <1/3 the average interval followed by a compensatory pause of 1.25 x average R-R interval or 2 such Vs without a compensatory pause occurring within 5 min. of each other. (When HR >100, 1/3 R-R interval is too short for detection.) in one minute.	Bar

Trend Graphs	Definition	Type
Max PVC Run	The longest PVC run (largest number of V's in a run) in the last minute.	Bar
% Bigeminy	% of Ventricular Bigeminy Rhythm (N, V, N, V, N beat labels) in one minute	Bar
%Trigeminy	% of Ventricular Trigeminy Rhythm (N, N, V, N, N, V, N, N beat labels) in one minute.	Bar
% Paced	% of Paced Beats ("P" beats) in one minute.	Bar
% Atrial Paced	% of Paced Beats ("P" beats) with a Pace Pulse > 150 msec before the QRS in one minute.	Bar
% Vent Paced	% of Paced Beats ("P" beats) with a Pace Pulse < 150 msec before the QRS in one minute.	Bar
% AV Paced	% of Paced Beats ("P" beats) with 2 pace pulses (one > 150 msec and one < 150 msec) before the QRS in one minute.	Bar
% Irregular HR	% of the sum of all R-R intervals with adjacent intervals which vary more than 12.5% and the beats are labeled as N or S and excluding M over 1 minute.	Bar
% Poor Signal	% Poor Signal identified as sum of all RR intervals with at least one beat labeled as A or ? over 1 minute.	Bar
NNSD	Standard Deviation of NN R-R intervals where R-R intervals are less than 4 seconds averaged in one minute	Bar
PVC Rate	Average of the PVC count in one minute.	Line
pNN50	% of NNN beat sequences with changes of adjacent R-R intervals greater than 50msec in one minute. A measure of heart rate variability (HRV).	Bar
V-V Rate Min	Minimum heart rate of runs of beats labeled "V" in one minute	Line
V-V Rate Max	Maximum heart rate of runs of beats labeled "V" in one minute	Line

Trend Graphs	Definition	Type
Paced Rate Min	Minimum heart rate of runs of beats labeled “P” in one minute	Line
Paced Rate Max	Maximum rate of runs of beats labeled “P” in one minute	Line
S-S Rate Min	Minimum heart rate of runs of beats labeled “S” in one minute	Line
S-S Rate Max	Maximum heart rate of runs of beats labeled “S” in one minute	Line
Atrial Paced Beat Count	Total number of “P” beats with detected pace pulse > 150 msec before QRS in one minute.	Bar
Ventricular Paced Beat Count	Total number of beats labeled “P” with detected pace pulse < 150 msec before QRS in one minute.	Bar
A-V Paced Beat Count	Total number of beats labeled “P” with a detected pace pulse < 150 msec before QRS and a detected pace pulse > 150 msec before QRS in one minute.	Bar
Normal Beat Count	Total number of beats labeled “N” in one minute	Bar
Ventricular Beat Count	Total number of beats labeled “V” in one minute	Bar
SVPB Beat Count	Total number of beats labeled “S” in one minute	Bar
All Beat Count	Total number of beats in one minute	Bar
V? Run Count	Total number of runs (> or =3 beats with labels “V” or “?”) in one minute.	Bar
Multiform Count	Total number of multiform “V” in one minute.	Bar
V-V Rate	Two trend lines which include V-V Rate Min and V-V Rate Max.	Line
Paced Rate	Two trend lines which include Paced Rate Min and Paced Rate Max.	Line

Trend Graphs	Definition	Type
S- S Rate	Two trend lines which include S-S Rate Min and S-S Rate Max.	Line
Tblood	Average blood temperature value (from cardiac output module) over one minute.	Line
T1	Average temperature 1 value over one minute.	Line
T2	Average temperature 2 value over one minute.	Line
DiffT	Average temperature difference value over one minute	Line
T3	Average temperature 3 value over one minute.	Line
T4	Average temperature 4 value over one minute.	Line
Tskin	Average skin temperature value over one minute.	Line
Tcore	Average core temperature value over one minute.	Line
Trect	Average rectal temperature value over one minute.	Line
Tesoph	Average esophageal temperature value over one minute.	Line
Tnaso	Average nasal temperature value over one minute.	Line
Tven	Average venous temperature value over one minute.	Line
Tart	Average arterial temperature value over one minute.	Line
SaO2	Average or aperiodic value of oxygen saturation value over one minute	Line
SvO2	Average venous oxygen saturation over one minute.	Line
AWRR	Average airway respiration rate over one minute.	Line
PIP	Average peak inspiratory pressure value over one minute.	Line
TV	Average tidal volume value over one minute.	Line
EtCO₂	Average end-tidal carbon dioxide value over one minute.	Line

Trend Graphs	Definition	Type
IMCO₂	Average inspired minimum carbon dioxide value over one minute.	Line
tcpCO₂	Average transcutaneous carbon dioxide value over one minute.	Line
FIO₂	Average fraction of inspired oxygen value over one minute.	Line
tcpO₂	Average transcuntaneous oxygen value over one minute.	Line
AWP	Average airway pressure value over one minute.	Line
AWF	Average airway flow value over one minute	Line
AUX	Average value from auxiliary Vuelink module over one minute.	Line
BIS	Average Bispectral Index value over one minute	Line

Event Definitions

Defined Events

Defined events are arrhythmia events and other defined events such as alarms off or patient button. Arrhythmia events use the ST/AR arrhythmia analysis beat labelling, rate calculation and some settings. Arrhythmia events do not require the arrhythmia alarm to be active.

“N” = Normal beat

“V” = Ventricular beat

“P” = Paced beat

“S” = Supraventricular premature beat

“?” = Insufficient information to classify beat

The duration of the defined event bars is dependent on the length of the event. If the event is active for 5 minutes event duration is 5 minutes. For example an event such as Pair V Event is a short event - two Vs are detected and the event is complete. An event such as Ventricular Bigeminy the bar extends until the event is over, therefore showing you the duration of the ventricular bigeminy.

Events	Definition
Some ECG Alarms off	One or more ** level Arrhythmia alarms have been manually turned off.
Alarms off	NO ARRHYTHMIA, ALL ARRH ALRMS OFF, and ALARMS SUSPENDED trigger the ALARMS OFF event.
Arrhythmia Event	Any of the following arrhythmia events:
Pair V Event	Two beats labelled as “V”

Events	Definition
Run V Event	Two or more beats
Fast Run V Event	Two or more beats labelled as “V” with a V rate of ≥ 120 b/min
Long Run V Event	Two or more beats labelled as “V” which lasts > 8 seconds
Pair V? Event	Two beats labelled as “V” and “?”
Run V? Event	Two or more beats labelled as “Vs” and “?” with a V rate of 60-120b/min
Fast Run V? Event	Two or more beats labelled as “Vs” and “?” with a V rate of >120b/min
Run P Event	Two or more beats labelled as “P” with a P rate of 60-120b/min
Fast Run P Event	Two or more beats labelled as “P” with a P rate of ≥ 120 b/min
Fast Long Run P	Two or more beats labelled as “P” with a P rate of > 120b/min which lasts > 8 seconds
Slow Run P Event	Two or more beats labelled as “P” with a P rate of <60 b/min
Pair SVPB Event	Two beats labelled as “S”
Run SVPB Event	Two or more beats labelled as “S”
Fast Run SVPB Event	Two or more beats labelled as “S” with S rate >120 b/min
Missed Beat Event	No beat detected for 1.75 x average R-R interval for HR <120, or no beat for 1 second with HR >120 (non-paced patient only)

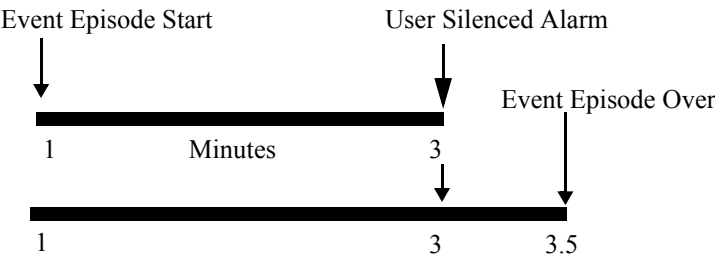
Events	Definition
Pause	No QRS detected for x seconds. Choices of >1.5 to 2.5 seconds.
Pacer Not Capture Event	No QRS for 1.75 x the average R-R interval with Pace Pulse (paced patient only)
Pacer Not Paced Event	No QRS and Pace Pulse for 1.75 x the average R-R interval (paced patient only)
R-on-T PVC Event	R-ON-T detected.
Multiform PVC Event	Multiform PVCs detected
Ventricular Rhythm Event	A dominant rhythm of adjacent Vs > vent rhythm limit and ventricular HR < V-Tach HR limit
Ventricular Bigeminy	A dominant rhythm of N, V, N, V (N=supraventricular beat, V=ventricular beat)
Ventricular Trigeminy	A dominant rhythm of N, N, V, N, N, V (N=supraventricular beat, V=ventricular beat)
Asystole Event	No QRS detected for x seconds. Choices of > 2.5 to 4 seconds
Vfib/Vtach Event	A fibrillatory wave (sinusoidal wave between 2-10 Hz) for 4 consecutive seconds
Patient Button	If the patient activates the telemetry button on the telemetry device and the button is active.

**Alarm
Defined
Events**

Alarm defined events include arrhythmia alarms as well as other measurement alarms. Alarm defined events are defined by the alarm settings for arrhythmia and other measurements.

The duration of the alarm event bars is dependent on the length of episode and the user’s response to the alarm. In other words the length of the event bar reflects the length the alarm message was displayed. If the event is short in duration, the alarm message will be displayed until the user responds (latched alarms) or until the event is over (non-latched alarms). If the episode is long in duration the message continues until the event is over and the event bar is longer, even if the user responds.

For example, a short run of VTACH, user responds in 3 minutes.



Events	Definition
YLW Alarms	All yellow alarms - both arrhythmia, ST and bedside generated alarms
All Alarms	All alarms - Red and Yellow arrhythmia, ST and bedside generated alarms
Arrhythmia Alarms	All alarms - Red and Yellow arrhythmia
RED ARRHY ALARMS	Red arrhythmia alarms
YLW ARRHY ALARMS	Yellow arrhythmia alarms
BED ALARMS	Any Red or Yellow bedside generated alarm

Events	Definition
RED BED ALARMS	Any Red bedside generated alarm
YLW BED ALARMS	Any Yellow bedside generated alarm
ST Alarms (Tel)	Yellow ST Alarms for Telemetry
***ASYSTOLE	No QRS detected for x seconds. Choices of > 2.5 to 4 seconds
***VIFIB/VTACH	Fibrillatory wave (sinusoidal wave between 2-10 Hz) for 4 consecutive seconds
***VTACH	Consecutive PVCs \geq V-Tach Run limit <u>and</u> HR > V-Tach HR limit
***EXTREME BRADY	Heart Rate less than the Extreme Brady limit. This is set as difference from the HR Low limit.
***EXTREME TACHY	Heart Rate greater than the Extreme Tachy limit. This is set as difference from the HR High limit.
*NON SUSTAIN VTACH	A run of Vs having HR > V-Tach HR limit, but lasting for less than the V-Tach Run limit
*VENT RHYTHM	A dominant rhythm of adjacent Vs > vent rhythm limit and ventricular HR < V-Tach HR limit
*RUN OF PVCs	Run of PVCs greater than 2
*PAIR PVCs	Two consecutive PVCs between non-PVCs
*R-ON-T PVC	For HR <100, a PVC with R-R interval <1/3 the average interval followed by a compensatory pause of 1.25 x average R-R interval or 2 such Vs without a compensatory pause occurring within 5 min. of each other. (When HR >100, 1/3 R-R interval is too short for detection.)

Events	Definition
*VENT BIGEMINY	A dominant rhythm of N, V, N, V, N (N=supraventricular beat, V=ventricular beat)
*VENT TRIGEMINY	A dominant rhythm of N, N, V, N, N, V, N, N (N=supraventricular beat, V=ventricular beat)
*PVC RATE	PVCs within one minute exceeded the PVCs / min limit
*MULTIFORM PVCs	The occurrence of two differently shaped Vs, each occurring at least twice within the last 300 beats as well as each occurring at least once within the last 60 beats
*PACE NOT CAPT	No QRS for 1.75 x the average R-R interval with Pace Pulse (paced patient only)
*PACE NOT PACE	No QRS and Pace Pulse for 1.75 x the average R-R interval (paced patient only)
*MISSED BEAT	No beat detected for 1.75 x average R-R interval for HR <120, or no beat for 1 second with HR >120 (non-paced patient only)
*PAUSE	No QRS detected for x seconds. Choices of >1.5 to 2.5 seconds. Note: M3/M4- No beat detected for 1.75 x average R-R interval for HR <120, or no beat for 1 second with HR >120 (non-paced patient only)
*SVT	Run of SVPBs >= SVT Run limit and SVT Heart Rate > SVT HR limit
*IRREGULAR HR	Consistently irregular rhythm (irregular R-R intervals)
*HR HIGH	Heart Rate greater than the upper HR limit

Events	Definition
*HR LOW	Heart Rate lower than the lower HR limit
**RESP HIGH	Respiration Rate greater than the upper RR limit
**RESP LOW	Respiration Rate lower than the lower RR limit
***Apnea	Respiration has stopped for longer than the set apnea time.
**SPO2 HIGH **SPO2 LOW	SpO2 greater than the upper SpO2 limit SpO2 lower than the lower SpO2 limit
**SVO2 HIGH **SVO2 LOW	SvO2 greater than the upper SvO2 limit SvO2 lower than the lower SvO2 limit

Events	Definition
**ST I HIGH **ST I LOW **ST II HIGH **ST II LOW **ST III HIGH **ST III LOW **ST aVF HIGH **ST aVF LOW **ST aVL HIGH **ST aVL LOW **ST aVR HIGH **ST aVR LOW **ST V HIGH **ST V LOW **ST V1 HIGH **ST V1 LOW **ST V2 HIGH **ST V2 LOW **ST V3 HIGH **ST V3 LOW **ST V4 HIGH **ST V4 LOW **ST V5 HIGH **ST V5 LOW **ST V6 HIGH **ST V6 LOW **ST MCL HIGH **ST MCL LOW	ST greater than the upper ST limit ST lower than the lower ST limit
**PULSE HIGH **PULSE LOW	Pulse greater than the upper Pulse limit Pulse lower than the lower Pulse limit
**NBP HIGH **NBP LOW	NBP greater than the upper NBP limit NBP lower than the lower NBP limit
**CPP HIGH **CPP LOW	CPP greater than the upper CPP limit CPP lower than the lower CPP limit

Events	Definition
**AWRR HIGH **AWRR LOW	awRR greater than the upper awRR limit awRR lower than the lower awRR limit
**EtCO2 HIGH **EtCO2 LOW	EtCO2 greater than the upper EtCO2 limit EtCO2 lower than the lower EtCO2 limit
**FiO2 HIGH **FiO2 LOW	FiO2 greater than the upper FiO2 limit FiO2 lower than the lower FiO2 limit
**IMCO2 HIGH	imCO2 greater than the upper imCO2 limit
**tcpO2 HIGH **tcpO2 LOW	tcO2 greater than the upper tcO2 limit tcO2 lower than the lower tcO2 limit
**tcpCO2 HIGH **tcpCO2 LOW	tcCO2 greater than the upper tcCO2 limit tcCO2 lower than the lower tcCO2 limit
**<Temp Label>HIGH **<Temp Label>LOW	<Temp Label> greater than the upper <Temp Label> limit <Temp Label> lower than the lower <Temp Label> limit
**<PRESS LABEL> HIGH **<PRESS LABEL>LOW	<Press Label> greater than the upper <Press Label> limit <Press Label> lower than the lower <Press Label> limit
***P1 DISCONNECT ***P2 DISCONNECT ***P3 DISCONNECT ***P4 DISCONNECT ***ABP DISCONNECT ***PAP DISCONNECT ***IUP DISCONNECT ***ARTDISCONNECT ***UAP DISCONNECT	The pressure is non-pulsatile and the mean pressure is continuously less than 10mmHg (1.3kPa). This alarm occurs only with arterial pressures (P, ABP, ART, AO, UAP, PAP).numeric flashes, red alarm lamp, alarm tone.

Events	Definition
***VENTILATOR DISCONNECT	Ventilator Disconnected from patient. (availability depends on Vuelink Device))
**CCO HIGH **CCO LOW	CCO greater than the upper CCO limit CCO lower than the lower CCO limit
**BIS HIGH **BIS LOW	BIS greater than the upper BIS limit BIS lower than the lower BIS limit
**VUELINK OTHER ALARM	Type of alarm depends on Vuelink Device.

ST/AR Configuration Reporting

This appendix provides a list of the 7-character encoded ST/AR configuration parameters that display as part of the alarm information on alarm strip recordings. This information can assist user in identifying problems in the operation of STAR arrhythmia analysis as well assist in interpreting the results obtained by the algorithm.

These items are coded into a 7 character string, as follows:

Character	Identifies
First	ST/AR's revision.
Second	Patient category, pacing mode and analysis level.
Third and Fourth	<ul style="list-style-type: none">• Classification mode (single or multi-lead)• Detection mode (auto or manual)• User specified lead label (manual detection mode only)• User specified minimum threshold (150-350uV) (manual detection mode only)• Algorithm minimum detection threshold (150-350uV) (manual detection mode only)
Fifth	Number of active classification and detection channels EASI mode/EASI coefficient set
Sixth	ECG hardware source and lead set in use (3-wire, EASI, etc.)
Seventh	Source of Asystole, Pause, Missed Beat, PNP or PNC alarm (detection or beat interval)

**First
Character
Codes**

The first character identifies the ST/AR revision.

STAR revision	First Character
Release E	4

**Second
Character
Codes**

The second character identifies the patient category, pacing mode and analysis level.

Patient Type	Paced Mode	Arrhythmia Level	Second Character
Neo	True	Cardiotach	0
		Basic	1
		Enhanced	2
	False	Cardiotach	3
		Basic	4
		Enhanced	5
Ped	True	Cardiotach	6
		Basic	7
		Enhanced	8
	False	Cardiotach	9
		Basic	B
		Enhanced	C

Patient Type	Paced Mode	Arrhythmia Level	Second Character
Adult	True	Cardiotach	D
		Basic	F
		Enhanced	G
	False	Cardiotach	H
		Basic	J
		Enhanced	K

Third and Fourth Character Codes

The third and fourth character identifies the:

- Classification mode (single or multi-lead)
- Detection mode (auto or manual)
- User specified lead label (manual detection mode only)
- User specified minimum threshold (150-350uV) (manual detection mode only)
- Algorithm minimum detection threshold (150-350uV) (manual detection mode only)

Note—Use the Multi/Manual/Lead I entries as a guideline in determining the appropriate expanded values for each Lead listed in the table below.

Classification Mode	Detection Mode	User Specified Detection Lead	User Specified Detection Threshold	Algorithm Minimum Detection Threshold	Third And Fourth Character
Multi	Auto	N/A	N/A	150	00
	Manual	Lead I	150	150	10
				350	11 ^a
			200	200	12
				350	13 ^b
			250	250	14
				350	15 ^c
			300	300	16
				350	17 ^d
			350	350	18
				350	19 ^e
		Lead II	150 - 350	150 - 350	20 - 29

Classification Mode	Detection Mode	User Specified Detection Lead	User Specified Detection Threshold	Algorithm Minimum Detection Threshold	Third And Fourth Character
		Lead III	150 - 350	150 - 350	30 - 39
		Lead AVR	150 - 350	150 - 350	40 - 49
		Lead AVL	150 - 350	150 - 350	50 - 59
		Lead AVF	150 - 350	150 - 350	60 - 69
		Lead V1	150 - 350	150 - 350	70 - 79
		Lead V2	150 - 350	150 - 350	80 - 89
		Lead V3	150 - 350	150 - 350	90 - 99
		Lead V4	150 - 350	150 - 350	B0 - B9
		Lead V5	150 - 350	150 - 350	C0 - C9
		Lead V6	150 - 350	150 - 350	D0 - D9
		Lead V	150 - 350	150 - 350	F0 - F9
		Lead MCL1	150 - 350	150 - 350	G0 - G9
		Lead MCL2	150 - 350	150 - 350	H0 - H9
		Lead MCL3	150 - 350	150 - 350	J0 - J9
		Lead MCL4	150 - 350	150 - 350	K0 - K9
		Lead MCL5	150 - 350	150 - 350	L0 - L9
		Lead MCL6	150 - 350	150 - 350	M0 - M9
		Lead MCL	150 - 350	150 - 350	N0 - N9
Single	Auto	N/A	N/A	150	01

Classification Mode	Detection Mode	User Specified Detection Lead	User Specified Detection Threshold	Algorithm Minimum Detection Threshold	Third And Fourth Character
	Manual	Lead I	150 - 350	150 - 350	P0 - P9
		Lead II	150 - 350	150 - 350	R0 - R9
		Lead III	150 - 350	150 - 350	S0 - S9
		Lead AVR	150 - 350	150 - 350	T0 - T9
		Lead AVL	150 - 350	150 - 350	V0 - V9
		Lead AVF	150 - 350	150 - 350	W0 - W9
		Lead V1	150 - 350	150 - 350	X0 - X9
		Lead V2	150 - 350	150 - 350	Y0 - Y9
		Lead V3	150 - 350	150 - 350	Z0 - Z9
		Lead V4	150 - 350	150 - 350	b0 - b9
		Lead V5	150 - 350	150 - 350	c0 - c9
		Lead V6	150 - 350	150 - 350	d0 - d9
		Lead V	150 - 350	150 - 350	f0 - f9
		Lead MCL1	150 - 350	150 - 350	g0 - g9
		Lead MCL2	150 - 350	150 - 350	h0 - h9
		Lead MCL3	150 - 350	150 - 350	j0 - j9
		Lead MCL4	150 - 350	150 - 350	k0 - k9
		Lead MCL5	150 - 350	150 - 350	m0 - m9
		Lead MCL6	150 - 350	150 - 350	n0 - n9

Classification Mode	Detection Mode	User Specified Detection Lead	User Specified Detection Threshold	Algorithm Minimum Detection Threshold	Third And Fourth Character
		Lead MCL	150 - 350	150 - 350	p0 - p9

- a. User specified lead is not active
- b. User specified lead is not active
- c. User specified lead is not active
- d. User specified lead is not active
- e. User specified lead is not active

Fifth Character Codes

The fifth character identifies the number of active classification and detection channels and EASI mode/EASI coefficient set.

EASI Mode	Active Classification Channels	Active Detection Channels	Fifth Character
Standard (non-EASI) electrode placement	0	0	0
		1	1
		2	2
	1	0	3
		1	4
		2	5
	2	0	6
		1	7
		2	8
EASI placement for Conventional 12-Lead derivation	0	0	9
		1	B
		2	C
	1	0	D
		1	F
		2	G
	2	0	H
		1	J
		2	K

**Sixth
Character
Codes**

The sixth character identifies the ECG hardware source and lead set in use (3-wire, EASI, etc.).

ECG HW Source	Lead Set	Sixth Character
unknown	unknown	0 or z
	3w	1
	4w	2
	5w	3
	10w	4
M1401 Telemetry	unknown	5
	3w	6
	4w	7
	5w	8
	10w	5
ECG A module	unknown	9
	3w	B
	4w	9
	5w	C
	10w	9

ECG HW Source	Lead Set	Sixth Character
ECG/resp A module	unknown	D
	3w	F
	4w	D
	5w	G
	10w	D
ECG B module	unknown	H
	3w	J
	4w	H
	5w	K
	10w	H
ECG/resp B module	unknown	L
	3w	M
	4w	L
	5w	N
	10w	L
M3000A Measurement Server	unknown	P
	3w	R
	4w	P
	5w	S
	10w	P

ECG HW Source	Lead Set	Sixth Character
M2600 Telemetry	unknown	T
	3w	V
	4w	P
	5w	W
	10w	P
M3001A Measurement Server	unknown	b
	3w	c
	4w	b
	5w	d
	10w	f

Seventh Character Code

The seventh character identifies the Source of Asystole, Pause, Missed Beat, PNP or PNC alarm (detection or beat interval).

Event Source	Seventh Character
N/A	0
look_ahead	1
look_back	2
look ahead beat rejection	3

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Numerics

- 12 Lead Review Window
 - using with 12 lead captures, 6-44
 - using with EASI derived 12 lead, 6-47
- 12-Lead ECG button, 1-24
- 12-Lead Review Window
 - from Information Center Web, 6-69
 - overview, 6-43
- 12-leads
 - report, 1-31
 - viewing, 1-31

A

- access
 - none, 1-35
 - read only, 1-34
 - read-write, 1-34
 - read-write, multiple viewers, 1-35
 - types of, 1-34
- adjusting
 - Patient Window parameters, 1-22
- admitting
 - from a hospital information system, 2-4
 - how to, 2-4
 - overview, 2-3
 - paced patients, 2-6, 4-18
- alarm paging
 - caregivers, 7-5
 - receivers, 7-5
- alarm recordings
 - priority, 3-14
 - turning off, 4-40
 - unit settings, 9-9
- Alarm Review Window
 - deleting, 6-11
 - from Information Center Web, 6-67
 - overview, 6-8
 - printing from, 6-12
 - selecting waves stored in, 6-53
 - using, 6-9
 - viewing saved strips, 6-9
- alarm strips
 - calipers, 6-14
 - comments on, 6-14
 - printing, 6-12
 - re-labeling, 6-10
- alarms
 - adjusting volume, 4-38
 - adjustments, 4-17
 - arrhythmia messages, 4-8
 - chaining, 4-26
 - deleting, 6-11
 - detection, 4-2
 - effects of adjustments on, 4-24
 - false arrhythmia, 5-24
 - fast alarm review, 4-33
 - indicators, 4-3
 - inhibiting sound at bedside, 4-21
 - levels and priorities, 4-4
 - making adjustments to, 4-13
 - multiple, 4-26
 - nurse call, 4-5
 - printing, 6-12
 - priorities, 4-27
 - recording/storing, 4-39
 - re-labeling, 6-10
 - reminders, 4-32
 - setting Smart Limits, 4-22
 - silencing, 4-30
 - sounds, 4-6
 - storage of arrhythmia, 4-39
 - stored, 6-8
 - suspending/unsuspending, 4-34
 - timeout periods, 4-25
 - turning off storage, 4-39
 - turning off/on, 4-17
 - viewing, 6-9
 - with M3 monitors, 4-2

- arrhythmia alarms
 - basic, 5-3
 - false, 5-24
 - M3150, 5-4
 - making adjustments to, 4-16
 - messages, 4-8
 - storage of, 4-40
 - turning off, 4-21
 - unit settings, 9-6
 - with M3 monitors, 4-2
 - yellow timeout periods, 4-25
- Arrhythmia Alarms Window
 - field descriptions, 4-17
 - making alarm adjustments, 4-16
- arrhythmia analysis
 - beat classification, 1-23, 5-7
 - changing, 4-19
 - description, 5-5
 - ensuring accurate, 5-6
 - example of good ECG for, 5-11
 - Multilead, 4-19
 - no arrhythmia, 4-20, 4-23
 - no arrhythmia/ST, 4-20, 4-23
 - Singlelead, 4-19
 - viewing leads for, 5-10
- Arrhythmia Analysis button, 1-23
- arrhythmia INOP messages
 - responding to, 4-11
- assigning a bed to a care group, 2-17

B

- beds
 - assigning overview, 2-38
 - monitored by another Information Center, 1-34
- bedside
 - alarm sound, 4-21
 - making alarm adjustments, 4-13
 - wireless IntelliVue Clinical Network, 1-35
- bedside, standby, 1-29
- buttons
 - in Fast Alarm Review, 6-15

- in patient sector, 1-18

C

- calipers, 6-6
- Cannot Analyze ECG (sound), 4-22
- care group
 - assigning a bed, 2-17
 - setting up with M3 and IntelliVue Patient Monitors, 2-15
- care groups, 2-13
 - M3 and IntelliVue Patient Monitor bedsides, 2-13
 - setting up, 2-14
- CareNet
 - description, 1-2
- chaining, 4-26
- chains, 4-28, 4-29
- comments
 - adding to saved strips, 6-6
- configuration
 - arrhythmia alarms, 9-6
 - event groups, 9-22
 - Information Center, 9-2
 - record/store alarms, 9-9
 - ST alarms, 9-13
 - stored waves, 9-26
 - trend groups, 9-15
 - using unit setting menus, 9-5
 - volume control, 9-37
- conflict resolution, 2-10
- conflicts
 - bedsides, 2-11
 - M3 or IntelliVue Patient Monitor bedsides, 2-10
- connection to database lost, 10-27
- continuous recording, 1-23

D

- database
 - local, 10-27
 - lost connection, 10-27

- database server, 1-5
 - connection lost, 10-27
- database server, capabilities, 1-5
- defaults
 - See unit settings, 9-4
- delayed recordings, 3-5
 - extending at M3 monitor, 3-7
 - for IntelliVue Patient Monitors, 3-5
 - for M3 monitors, 3-5
 - making continuous, 3-7
 - making delayed for all beds, 3-7
 - priority, 3-14
 - record all, 3-7
- deleting
 - alarms, 6-11
- discharged patients
 - re-admitting, 2-5, 2-9, 2-27
- discharging
 - for transport, 2-22
 - how to, 2-20
 - M3 and IntelliVue Patient Monitors, 2-19
 - without losing patient data, 2-21
- discharging for transport, 2-19
- display
 - specifications, 10-5
- display screens, 1-15
 - dual, 1-20
 - Main Screen, 1-15
 - message areas, 1-16
 - patient sectors, 1-16
 - single, 1-20
 - two main, 1-21
- dual display, 1-20

E

- EASI
 - 12-lead review, 6-43
 - ST, 8-2
- ECG
 - performance specifications, 10-16
- ECG waves
 - examples of good, 5-11

- learning, 5-17
 - optimizing for arrhythmia analysis, 1-23, 5-6
- ectopic status messages, 5-22
- event groups, 6-22
 - unit settings, 9-22
- Event Review Window
 - cursor/event information, 6-22
 - event bars, 6-23
 - from Information Center Web, 6-68
 - overview, 6-22
 - printing from, 6-27
 - using, 6-24
- events
 - associating text with, 6-24
 - selecting specific, 6-24
 - viewing waves for, 6-33
- export data
 - Holter system, 6-50

F

- Fast Alarm Review, 4-33, 6-15
 - buttons, 6-15
- features, 1-10, 1-11
- fixed and flexible monitoring, 2-28

G

- grounding
 - Information Center, 10-23

H

- heart rate
 - setting alarm limits, 4-22
- Holter system
 - export data to, 6-50

I

- icons
 - Patient Window, 1-22
- Information Center, 10-23
 - applications, 2-2

- configuration, 9-2
- maintenance
 - Information Center, 10-29
- models, 1-2
- specifications, 10-1
- Information Center Web
 - using, 6-64
- INOP alarms
 - reminders, 4-32
- INOP messages
 - arrhythmia, 4-11
- IntelliVue Clinical Network
 - description, 1-5
 - viewing patients over, 1-33
- interference, 1-36

L

- labels
 - arrhythmia beat, 1-23, 5-7
- learning, 5-17
- loading
 - paper in M1116B 2-channel recorder, 3-19
 - paper in M3176C 2-channel recorder, 3-22
- local database mode, 10-27
 - operating in, 10-27

M

- M3
 - system messages, 1-37
- M31260A
 - specifications, 10-21
- M3150
 - power requirements, 10-23
- M3150/55
 - features, 10-6
 - options, 10-6
- M3151
 - features, 10-7
 - options, 10-7
- M3154A
 - features, 10-9, 10-10

- options, 10-9, 10-10
- M3170
 - features, 10-8
 - options, 10-8
- Main Screen, 1-15
- maintenance, 10-29
- messages
 - arrhythmia alarm, 4-8
 - arrhythmia INOP, 4-11
 - ectopic status, 5-22
 - M3 system, 1-37
 - recorder at M3 monitor, 3-14, 3-16
 - recording status, 3-15
 - rhythm status, 5-20
- monitoring
 - fixed, 2-28
 - flexible, 2-28
- monitoring devices, 1-11
 - functionality, 1-12
- More Waves button, 1-24
- multilead analysis
 - changes in one lead, 5-18
 - fallback, 5-19
 - learning, 5-17
- Multilead ECG
 - button, 1-23
 - from Information Center Web, 6-67

N

- navigation
 - within Wave Review, 6-30
- no access to data, 1-35
- no arrhythmia, 4-20, 4-23

O

- On-line help
 - using, 1-39
- on-line help
 - using, 1-39

- operating on local DB, 10-27
- other Information Centers
 - viewing patients on, 1-33
- other units
 - viewing patients in, 1-33
- overview beds, 1-34, 2-28
 - access controls, 1-34
 - assigning, 2-38
 - on the IntelliVue Clinical Network, 1-33
 - viewing, 1-34

P

- paced patients
 - admitting, 2-6, 4-18
 - re-admitting, 2-27
 - repolarization tails, 5-16
 - setting status, 5-14
 - warnings for, 5-14
 - with M3 monitors, 2-6
- patient
 - discharging, 2-19
- patient data
 - saving upon discharge, 2-21
- patient list
 - use of, 1-33
- patient sector
 - buttons, 1-18
 - Record and Save button, 1-18
 - Record button, 1-18
 - Save button, 1-18
 - save strips from, 3-8
- patient sectors, 1-16
- Patient Window, 1-18, 1-20
 - 12-Lead ECG button, 1-24
 - Arrhythmia Analysis button, 1-23
 - icons, 1-22
 - making parameter adjustments to, 1-22
 - More Waves button, 1-24
 - Multilead ECG button, 1-23
- point of care equipment
 - functionality, 1-12

- power loss, 10-26
 - telemetry mainframe, 10-26
- power requirements, 10-23
- printers, 3-29
- printing
 - 30 second strip report, 6-6
 - from Alarm Review, 6-12
 - from Event Review, 6-27
 - from Trend Review, 6-19
 - from Wave Review, 6-36
 - reports, 3-29
 - strips, 6-12

R

- re-admitting
 - discharged patients, 2-5
 - paced patients, 2-27
- read-only access, 1-34
- read-write access, 1-34
 - multiple viewers, 1-35
- real-time recordings, 3-9
- priority, 3-14
- record all, 3-7
- Record and Save button, 1-18
- Record button, 1-18
- recorder
 - 4-channel
 - connections, 3-28
 - controls, 3-13
 - indicators, 3-13
 - loading paper, 3-24
 - unloading paper, 3-24
 - controls, 3-11, 3-12, 3-13
 - loading paper in M1116B 2-channel recorder, 3-19
 - loading paper in M3176C 2-channel recorder, 3-22
 - messages at the M3 Monitor, 3-14, 3-16
 - removing paper, 3-23
 - removing paper from M1116B 2-channel recorder, 3-20

- removing paper from M3176C 2-channel recorder, 3-23
- supplies, 3-29
- recording
 - continuous, 1-23
- recordings, 1-11
 - alarm unit settings, 9-9
 - alarms, 3-8, 4-39
 - arrhythmia alarms, 3-4
 - extending delayed at M3 monitor, 3-7
 - generated from M3 or IntelliVue Patient Monitors, 3-4
 - making delayed, 3-5
 - making real-time, 3-9
 - status messages, 3-15
 - stopping, 3-7
 - turning on/off, 4-39
 - types, 3-3
 - waves recorded, 3-4
- red alarms
 - adjustments, 4-22
 - reminders, 4-32
- re-labeling
 - alarms, 6-10
- reminders, 4-32
- remote diagnostics, 10-29
- remote viewing
 - no access to data, 1-35
 - read-only access, 1-34
 - read-write access, 1-34
- repolarization tails, 5-16
- reports, 1-11
 - 12-lead, 1-31
 - from Event Review, 6-27
 - from Wave Review, 6-36
 - printing, 3-29
 - printing full page strip, 6-6
 - scheduled, 6-54
 - unit settings, 9-5
- review windows
 - accessing, 6-2
 - alarm, 6-8
 - features, 6-4

- navigating between, 6-4
- overview, 6-2
- time line, 6-4
- updating, 6-5
- using strips in, 6-5

rhythm status messages, 5-20

S

- Save button, 1-18
- saved strips
 - from patient sector, 3-8
 - viewing, 6-9
- saving
 - patient data upon discharge, 2-21
- Scheduled Reports, 6-54
- Sector Setup Window
 - assigning beds, 2-30
- silencing
 - alarms, 4-30
 - procedure, 4-33
- single lead analysis
 - fallback, 5-19
 - learning, 5-17
- Smart Limits, 4-35
 - examples, 4-36
- sound
 - inhibiting at bedside, 4-21
- specifications
 - display, 10-5
 - ECG performance, 10-16
 - Information Center, 10-1
- ST
 - adjusting measurement points, 8-5
 - algorithm, 8-4
 - measurement, 8-3
 - turning on/off monitoring, 8-5
 - viewing data, 8-3
- ST alarms, 8-7
 - unit settings, 9-13
- ST review, 8-1
 - enabling for bedsides, 8-5

- ST Review Window
 - from Information Center Web, 6-69
 - using, 6-41
- ST segment monitoring, 8-2
- standby, 1-27
 - automatic resume monitoring, 1-27
 - use with bedside monitors, 1-27
 - use with telemetry, 1-27
- status messages, 5-20
 - ectopic, 5-22
 - recording, 3-15
 - rhythm, 5-20
- stored alarms
 - viewing, 6-8
- stored recordings
 - priority, 3-14
- stored waves
 - changing, 6-53
 - unit settings, 9-26
- Stored Waves Window, 6-53
- storing
 - alarm unit settings, 9-9
 - alarms, 4-39
 - turning off/on, 4-39
- strips
 - calipers on, 6-14
 - comments on, 6-14
 - deleting, 6-11
 - printing, 6-12
 - printing full-page report, 6-6
 - saving, 6-6
 - using, 6-5
- supplies
 - recorder, 3-29
- suspending
 - alarms, 4-34
- symbols
 - explanation of, 10-24

T

- telemetry, standby, 1-27
- time line
 - using the, 6-4
- timeout periods, 4-25
 - clearing, 4-26
- transferring patients, 2-24
- transmitter
 - transferring patients, 2-24
- transport
 - discharging for, 2-19, 2-22
- trend groups
 - unit settings, 9-15
- Trend Review Window
 - from Information Center Web, 6-68
 - printing from, 6-19

U

- unit settings
 - alarm record/store, 9-9
 - arrhythmia alarms, 9-6
 - event groups, 9-22
 - menus, 9-5
 - reports, 9-5
 - ST alarms, 9-13
 - stored waves, 9-26
 - trend groups, 9-15
 - volume control, 9-37
- unsuspending
 - alarms, 4-34
- updating
 - review windows, 6-5

V

- view beds
 - access controls, 1-34
- viewing
 - other bed, 2-38
- volume
 - adjusting alarm tone, 4-38
 - unit settings, 9-37

W

Wave Review Window

- from Information Center Web, 6-69
- navigation, 6-30
- overview, 6-30
- printing from, 6-36
- selecting wave for, 6-53
- using, 6-33

waves

- ECG examples, 5-11
- storing for a patient, 6-30
- viewing continuous, 6-30
- viewing with an event, 6-33

web access

- to Patient Data, 6-64

wireless IntelliVue Clinical Network

- data loss, 1-35
- information signal (system messages), 1-37
- interference, 1-36
- low signal strength, 1-36
- optimizing performance, 1-35
- system messages
 - excessive wireless data loss, 1-37
 - excessive wireless interference, 1-37

Y

yellow alarms

- adjustments, 4-22
- reminders, 4-32
- turning off/on, 4-17

yellow arrhythmia alarms

- timeout periods, 4-25